Public-data File 91-26

ESTIMATED USE OF WATER IN THE UNITED STATES 1990 SELECTED LARGE ALASKAN PUBLIC WATER SUPPLIERS DOCUMENTATION AND DATA FORMS

By

William A. Petrik[1]

Alaska Division of Geological and Geophysical Surveys

JUNE 1991

794 University Avenue, Suite 200
Fairbanks, Alaska 99709-3645

---

[1] ADGGS, P.O. Box 772116, Eagle River, Alaska 99577-2116

CONTENTS

INTRODUCTION

The USGS is conducting a National Water Use Information Program to compile pertinent water-use and related data on a national scale. The Alaska Department of Natural Resources, Division of Geological and Geophysical Surveys (DGGS) is continuing its cooperative effort with the USGS to develop pertinent water-use information for the State of Alaska. The Fiscal Year 1991 effort is oriented towards assisting the task of preparing the national USGS report, "Estimated Use of Water in the United States in 1990" (EUOWITUS). This effort will also add to the existing state effort of entering data into the Alaska Water Use Data System (AKWUDS) as part of a long term water-use program.

DGGS has been the agency responsible for gathering and storing water-use information for the State of Alaska for the past four years. DGGS has actively increased the water use knowledge of the State by continually updating Alaska's database (AKWUDS) and provided the USGS with annual summaries. DGGS has also developed contacts with many water using entities.

ACKNOWLEDGEMENTS

This report was prepared as part of a jointly funded cooperative agreement with the United States Geological Survey (USGS). Rick Noll prepared a thorough, detailed report of the Juneau area water use. Thanks to the many utility personnel that the author contacted during the completion of this report for the detailed information they provided.

OBJECTIVE

Once every five years, estimates of water use are aggregated by state in accordance with national guidelines and standards to meet regional and national needs. The EUOWITUS 1990 report will contain estimates of surface and ground water withdrawals, and deliveries from public suppliers. This report will serve as one of two deliverables to the USGS for contractual obligations for Federal Fiscal Year (FFY) 1991.

APPROACH

This report contains the majority of the Public Supply information required by the USGS for their 1990 data collection effort. Information has been collected for the following geographic areas:

1) Municipality of Anchorage . (including Girdwood, Eklutna, Elmendorf Air Force Base and Fort Richardson Army Base)
2) Fairbanks (City proper)
3) Juneau (City and Borough)
4) Kenai Peninsula . . . . . the cities of Homer, Kenai, Seward, and Soldotna, only
5) Nome (City proper)

The collected data fulfills the Public Supply requirements as described in the USGS Guidelines for the 1990 EUOWITUS effort. It includes fresh surface and ground water withdrawals; deliveries to domestic, commercial, industrial, and power users; population served; and the number of public supply facilities for the defined areas. If actual numbers were not available, estimates are provided. Water use estimates are made in million gallons per day (MGD) and population in thousands (1,000's).

Incidental work was added to the initial list including the public supply from College Utilities Corporation and effluent discharged by sewage treatment plants of most of the listed cities.

Final 1990 estimates were compared to the 1985 EUOWITUS estimates. In cases where these figures varied by more than 10 percent, an attempt was made to give a plausible explanation for these differences.

METHODS

Water use data were collected either verbally or through mail requests. Much written information received was followed up with subsequent telephone conversations. Where monthly water use data were available, LOTUS 1-2-3 software was utilized to synthesize data into monthly and yearly water use averages. These data included water use information on quantities withdrawn, released, delivered and returned. In many instances, public supply deliveries and withdrawals were separated by reports. The remaining situations required making estimates based on available metering or customer accounting data or assuming that deliveries equalled withdrawals. This later method was used only where necessary because it is less accurate than other methods.

DATA AND DOCUMENTATION

Data contained in this report includes detailed documentation on a case by case basis. Methods may vary from city to city based on available data. This documentation includes but is not limited to:

1) Detailed typed documentation forms prepared by the author using WORDPERFECT, version 5.1 software
2) USGS 1990 Data Collection Forms listing final water use estimates
3) USGS 1990 Documentation Sheets
4) Notes on water suppliers or population statistics resulting from telephone conversations
5) Water use reports from public water supply utility personnel
6) LOTUS 1-2-3 spreadsheet printouts of monthly and yearly water use calculations
7) Miscellaneous public information pamphlets on water supply
8) Newspaper articles
9) Revenue billing showing customer information
10) Excerpts from consultants' reports on water and wastewater facilities supplied by utility personnel

Public Supply estimates for each city are divided into withdrawals, deliveries, and effluent returns. Examination of this detailed documentation will explain how all final EUOWITUS figures were obtained.

SELECTED REFERENCES

Alaska Department of Community and Regional Affairs, Alaska Municipal League, 1988, Alaska Municipal Officials Directory, 1988, 157 p.

Alaska Department of Community and Regional Affairs, Office of the Commissioner, 1990, Certification of Population, 4 p.

Alaska Department of Community and Regional Affairs, Office of the Commissioner, 1990, Boroughs And Cities Within Boroughs, Population Summaries For FY 92 SRS/MA Program, 1 p.

Alaska Department of Environmental Conservation, 1991, Public Water Supply Inventory, Northern Region, Class A and B Systems, 17 p.

Alaska Department of Environmental Conservation, 1991, Public Water Supply Inventory, Southcentral Region, Class A Systems, 15 p.

Alaska Department of Environmental Conservation, 1991, Public Water Supply Inventory, Southcentral Region, Class B Systems, 25 p.

Alaska Department of Environmental Conservation, 1991, Public Water Supply Inventory, Southeast Region, Class A Systems, 2 p.

Alaska Department of Environmental Conservation, 1991, Public Water Supply Inventory, Southeast Region, Class B Systems, 5 p.

Anchorage Daily News, June 1, 1991, p. A12.

CH2M Hill Engineering of Alaska, Inc., 1976, City of Nome, Alaska, Water and Sewer Master Plan, 99 p.

Kenai Municipal Code

Municipality of Anchorage, Water and Wastewater Utility, Operations Division, 1991, Water and Wastewater Treatment Sections Annual Report, 1990, 86 p.

U.S. Department of Commerce, Bureau of the Census, 1991, Alaska, 1990 Population Totals, 14 p.

U.S. Office of Management and Budget, 1987, Standard Industrial Classification Manual: Statistical Policy Division, 705 p.

APPENDIX A

SPECIFIC DOCUMENTATION

CITY: Anchorage, Municipality of (MOA) - an aggregation of data from the public water suppliers listed below.

PUBLIC WATER SUPPLIERS

Utility	Contact
Anchorage Water & Wastewater	*
Crestbrook Water Association	$
Eklutna Utilities	$
Elmendorf Air Force Base	*
ERU, Inc. - Hylen Crest Utility	Charles Hylen, 561-5411
Fort Richardson Army Base	*
Girdwood:	
Alyeska Utilities	Greg Anderson, AWWU, 783-2875
Cherrier, King, & Cherrier	274-1551, or AWWU, 783-2875
Hillside Park Subdivision	@
Norfolk Utilities	Carl Berhardt, 344-6422
Southcentral Utilities	@
Southpark Terrace Subdivision	@
Viewpoint Ventures, Inc.	Bill McKever, 344-4581

* See existing EUOWITUS Data Collection Form

$ Gary Prokosch, Alaska Department of Land and Water, 562-2253

@ Bill Kranich, M-W Drilling, 349-8535, or $

WITHDRAWALS - FRESH

Utility	GW MGD	SW MGD	
Anchorage Water & Wastewater	2.16	21.67	
Crestbrook Water Association	0.01		
Eklutna Utilities	0.30		
Elmendorf Air Force Base	2.74	0.27	
ERU, Inc. - Hylen Crest Utility	0.01		
Fort Richardson Army Base	1.68	2.21	
Girdwood:			
Alyeska Utilities	0.16		
Cherrier, King, & Cherrier	0.08		
Hillside Park Subdivision	0.02		
Norfolk Utilities	0.22		
Southcentral Utilities	0.01		
Southpark Terrace Subd.	0.03		
Viewpoint Ventures, Inc.	0.01		
Total	**7.43**	**24.15**	**31.58**

POPULATION SERVED

Utility	GW 1,000's		SW 1,000's	
Anchorage Water & Wastewater	16.77		168.23	
Crestbrook Water Association	0.15	*		
Eklutna Utilities	1.15	*		
Elmendorf Air Force Base	.56		5.64	
ERU, Inc. - Hylen Crest Utility	0.09	*		
Fort Richardson Army Base	2.96		3.89	
Girdwood:				
Alyeska Utilities	2.13	@		
Cherrier, King, & Cherrier	1.00	@		
Hillside Park Subdivision	0.19	*		
Norfolk Utilities	2.20	*		
Southcentral Utilities	0.03	*		
Southpark Terrace Subd.	0.20	*		
Viewpoint Ventures, Inc.	0.15	*		
Total	**27.58**		**177.76**	**205.34**

* From the Alaska Department of Environmental Conservation, Public Water Supply Inventory, 1990.

@ Based on a W-U estimate of 75 gallons per person per day and an estimate from the Anchorage Water and Wastewater Utility, Customer Service Department of approximately 1,000 customer accounts in Girdwood.

DELIVERIES

Utility	Domestic MGD	Commercial MGD	Industrial MGD
Anchorage Water & Wastewater	12.29	3.63	1.83
Crestbrook Water Association	0.01		
Eklutna Utilities	0.30		
Elmendorf Air Force Base		3.01	
ERU, Inc. - Hylen Crest Utility	0.01		
Fort Richardson Army Base		3.81	
Girdwood:			
Alyeska Utilities	0.16		
Cherrier, King, & Cherrier	0.08		
Hillside Park Subdivision	0.02		
Norfolk Utilities	0.22		
Southcentral Utilities	0.01		
Southpark Terrace Subd.	0.03		
Viewpoint Ventures, Inc.	0.01		
Total	**13.14**	**10.45**	**1.83**

Fossil Fuel

Utility	MGD
Anchorage Municipal Light & Power	0.39
Elmendorf Air Force Base	0.54
Fort Richardson Army Base	0.54
Total	**1.47**

Total Deliveries

Type	MGD
Domestic	13.14
Commercial	10.45
Industrial	1.83
Fossil Fuel	1.47
Total	**26.89**

Efficiency of the public supply systems is total deliveries divided by total withdrawals:

26.89 MGD / 31.58 MGD = **85 percent**

SEWAGE TREATMENT

Utility	MGD
Anchorage Water & Wastewater	34.78
Elmendorf Air Force Base	<0.01
Total	**34.78**

PER CAPITA USE

1) The per capita use, defined as the total withdrawals divided by the population served, is:
31,580,000 gallons per day / 205,340 people = 154 gallons per person per day
The average residential per capita use in the Municipality of Anchorage, including EAFB and Fort Richardson, is:
13,140,000 gallons per day / 205,340 people = 64 gallons per person per day

COMPARISON OF 1985 TO 1990 SUMMARIES

1) Total Population - the 1985 EUOWITUS reported census was 244,000. The 1990 federal census data for Anchorage was 226,338 while the state figure was 230,185. Both state and federal figures fall within the 10 percent margin of error.
2) GW Population Served - In 1985, there were 118,000 people served. In 1990, there were 27,580 people served. This was a decrease of 77 percent. AWWU water sources have changed predominance from ground water to surface water.
3) SW Population Served - In 1985, there were 57,000 people served. In 1990, there were 177,760 people served. This was an increase of 212 percent. The change is due to AWWU changing from predominantly GW to SW sources.
4) Total Population Served - In 1985, the EUOWITUS figure was 175,000. The 1990 figure is 205,340. That is an increase of 17 percent. This increase is due to the effect of putting the Eklutna Lake Water Project on-line. Many communities that had new water mains to their neighborhoods had to surrender use of their domestic wells.
5) GW Withdrawals-Fresh - In 1985, 19.43 MGD were used while in 1990, 7.43 MGD were used. The margin of error is 62 percent. Again, this is reflective of AWWU changing from predominantly GW to SW withdrawals.
6) GW Withdrawals-Saline - no reported use in this category in 1985 nor 1990.
7) SW Withdrawals-Fresh - In 1985, 14.50 MGD were used. In 1990, 24.15 MGD were used. The margin of error is a 67 percent increase. The increase in this amount is attributable to AWWU changing from predominantly GW to SW sources.

8) Domestic - In 1985, deliveries to domestic uses totalled 13.18 MGD. In 1990, this figure was estimated at 13.14 MGD. This is an insignificant change.

9) Commercial - In 1985, deliveries to commercial uses was estimated at 20.00 MGD. In 1990, estimated commercial deliveries was estimated at 10.45 MGD. That is a 48 percent decrease in estimates. The change is attributable to different estimation methods as well as a possible slowdown of the Anchorage economy.

10) Industrial - In 1985, deliveries to industrial uses was estimated at .47 MGD. In 1990, estimated industrial deliveries was estimated at 1.83 MGD. That is a 289 percent increase in estimates. The change is attributable to different estimation methods.

11) Fossil Fuel - The 1985 figure was .35 MGD while the 1990 figure was 1.47 MGD. This 320 percent increase is attributable to adding W-U for the military bases within the Municipality of Anchorage. Otherwise, the W-U figure for 1990 is .39, an 11 percent increase. This change would probably be caused by an increase in power consumption or the number of customers served.

12) Per Capita Use - In 1985, this figure was 194 as opposed to 154 in 1990. This is a 21 percent decrease and could be attributable to different estimation techniques, a decrease in conveyance losses from installation of new water supply mains, or increase in water conservation practices, or a combination of all the preceding possibilities.

13) Nuclear - No W-U for nuclear power generation in Anchorage for 1985 nor 1990.

14) Sewage Treatment - In 1985, effluent from sewage treatment plants was 28.73 MGD. In 1990, the figure for similar use was 34.78 MGD. The 21 percent increase is probably due, in part, to more homes being hooked up to the Point Woronzof Wastewater Treatment Plant. This occurred when the new Eklutna Lake Water Project mains and sewers were installed and many homes on septic systems elected to hook into the municipality's system. In addition, a major portion of this water may come from an increase in the storm drain system in the municipality.

15) Number of Public Sewage Treatment Facilities - This number changed from two in 1985 to four in 1990. The municipality has three facilities. One each in Anchorage, Eagle River, and Girdwood. In addition, EAFB has a sewage treatment plant and lagoon. All these facilities have been on line since at least 1985.

ANCHORAGE, MUNICIPALITY OF

ESTIMATED USE OF WATER IN THE UNITED STATES
1990 – DATA COLLECTION FORM – 1990

68/6/2

COUNTY or HUC NAME _____ COUNTY or HUC CODE _____ TOTAL POPULATION 226.34 (in thousands)

* UNITS IN MGD TO TWO DECIMAL PLACES (UNLESS OTHERWISE SPECIFIED)

	WATER SUPPLY	DOMESTIC	COMMERCIAL	INDUSTRIAL	MINING	FOSSIL FUEL	NUCLEAR	HYDROELECTRIC	LIVESTOCK	ANIMAL SPECIALTIES	IRRIGATION	SEWAGE TRMT.	RESERVOIR EVAP
Total Water Use													
GW Withdrawals – Fresh	7.43												
GW Withdrawals – Saline	—												
SW Withdrawals – Fresh	24.15												
SW Withdrawals – Saline	—												
GW – Population Served (thous.)	27.58												
SW – Population Served (thous.)	177.76												
Deliveries from Water Supply:		13.14	10.45	1.83		1.47	—						
Consumptive Use – Fresh													
Consumptive Use – Saline													
Conveyance Loss													
Power Generation (GWh)													
Acres Irrigated – Sprayed (thous.)													
Acres Irrigated – Flooded (thous.)													
Number of Facilities													
# Facilities in WU Database												3	
WW total returns from municipal fac.												34.78	
# of Public WW Facilities												4	
# Industrial & Other WW Facilities													
Reclaimed Sewage													

TO: See Distribution
CC:
From: Robert R. Pierce, Hydrologist, Doraville, GA (RRPIERCE)
Date: Thursday, April 04, 1991 05:21:28
Subject: EUOWITUS DOCUMENTATION FORM

E U O W I T U S 1 9 9 0 ***** D O C U M E N T A T I O N

COMPLETE LIST OF SOURCES - (report ALL data received (incl.coefficients) that were used to complete the information for 1990 EUOWITUS)

** 1 **

CATEGORIES OF USE (IN,DO,IR etc): PWS, DO, CO, IN, FP, ST

TYPE (pumpage,acres,coefficient):

AGENCY ANCHORAGE, MUNICIPALITY OF

CONTACT PERSON

YEAR OF DATA 1990

ACCURACY FAIR

AERIAL EXTENT (site-specific, county, HUC, etc) MUNICIPALITY (GIRDWOOD TO EKLUTNA)

FORMAT (printout, publication, verbal communication, etc): REPORTS, SUMMARIES, NEWSPAPER ARTICLES, VERBAL COMMUNI

** 2 **

CATEGORIES OF USE (IN,DO,IR etc):

TYPE (pumpage,acres,coefficient):

AGENCY

CONTACT PERSON

YEAR OF DATA

ACCURACY

AERIAL EXTENT (site-specific, county, HUC, etc)

FORMAT (printout, publication, verbal communication

REPORTED EUOWITUS INFORMATION
- (From the listed sources above please explain how the 'reported' figures for COUNTY, HUC & AQUIFER were derived) In each case referal to any data (incl. coefficients) must come from the "COMPLETE LIST OF SOURCES".

-- WATER SUPPLY --

WITHDRAWALS 31.58

POPULATION SERVED 205.34

NUMBER OF FACILITIES 13

-- COMMERCIAL --

WITHDRAWALS

DELIVERIES 10.45

CONSUMPTIVE USE

-- DOMESTIC --

WITHDRAWALS

DELIVERIES 13 14

CONSUMPTIVE USE

-- INDUSTRIAL --	
WITHDRAWALS	
DELIVERIES	1.83
CONSUMPTIVE USE	
NUMBER OF FACILITIES	
RECLAIMED WASTEWATER	
-- THERMOELECTRIC --	
WITHDRAWALS	
DELIVERIES	1.47
CONSUMPTIVE USE	
NUMBER OF FACILITES	
-- MINING --	
WITHDRAWALS	
CONSUMPTIVE USE	
-- HYDROELECTRIC --	
TOTAL WATER USE	
POWER GENERATION	
NUMBER OF FACILITIES	
-- LIVESTOCK --	
WITHDRAWALS	
DELIVERIES	
CONSUMPTIVE USE	
-- IRRIGATION --	
WITHDRAWALS AMOUNTS	
CONSUMPTIVE USE	
CONVEYANCE LOSSES	
ACRES IRRIGATED (spray & flood:	
RECLAIMED WASTEWATER	
-- SEWAGE TREATMENT --	
NUMBER OF FACILITES	4
TOTAL WASTE WATER RETURNS	34.78
NUMBER OF PUBLIC WASTE WATER FACILITIES	4
NUMBER INDUSTRIAL & OTHER WASTE WATER FACILITIES	?
AMOUNT OF WATER RETURNED TO BENEFICIAL USE	ϕ
-- RESERVOIR EVAPORATION --	
CONSUMPTIVE USE	
SURFACE AREA	

TO: Distribution list.

Wayne B. Solley, Chief, BWOI, Reston, VA (WBSOLLEY)
David W. Litke, Hydrologist, Lakewood, CO (DWLITKE)
Nancy L. Barber, Hydrologist(Geologist), Jackson, MS (NLBARBER)
Leslie D. Patrick, Hyd (SA), Anchorage, AK (LDPATRICK)

SMTP: Recipient(s) list.

SABU former Alyeska Utilities this &
(MARCH-20) 160 kgd
Cheyenne, King, & Chenier now AWWU
(late 1990, Oct) 25 kgd

Glacier

Old Townsite

400 K/day withdrawal?

End of April will have better idea of amount of water withdrawn.

A lot of inflow from runoff from tops of Manholes

250 K/day during dry weather

Greg Anderson Girdwood WWU
Plant Foreman 783-2752

'86 W-U Summary shows .13 MGD total from Alyeska Utilities & Chenier, King, & Chenier

1990 AKWUDS Monthly and Yearly Water-Use Calculations Worksheet

Facility Name: CRESTBROOK WATER ASSOCIATION, INC. WELL

File Type and Number: ADL 206632-C Sequence # : 01 W

DATE	DAYS	METER READING	GALLONS	MGD	MONTH
1/1/90	-	3,484,337	-	-	-
2/1/90	31	3,806,913	322,576	0.010406	JAN
3/1/90	28	4,110,087	303,174	0.010828	FEB
4/1/90	31	4,363,053	272,966	0.008805	MAR
5/1/90	30	4,715,339	332,286	0.011076	APR
6/1/90	31	5,043,717	328,378	0.010593	MAY
7/1/90	30	5,341,920	298,203	0.009940	JUN
8/1/90	31	5,791,735	449,815	0.014510	JUL
9/1/90	31	6,065,786	274,051	0.008840	AUG
10/1/90	30	6,438,249	372,463	0.012415	SEP
11/1/90	31	6,735,622	297,373	0.009593	OCT
12/1/90	30	7,079,683	344,061	0.011469	NOV
1/1/91	31	7,592,708	513,025	0.016549	DEC
TOTALS:	365	4,108,371	4,108,371	0.011256	
					1990
	MAX:	0.016549	MIN:	0.008805	

1989 AWUDS Monthly and Yearly Water-Use Calculations Worksheet

Facility Name: EKLUTNA UTILITIES, INC. EAGLERIDGE WELLS

File Type and Number: LAS 1848 Sequence Number: 01 W

REPORT DATE	ACTUAL DAYS	MONTH	MONTH DATE	NORMAL DAYS	DAY FACTOR	METER READING	GALLONS	MGD	ADJUSTED GALLONS	NEW GALLONS	ADJUSTED MGD
12/16/88			12/16/88		0	258,660,300			0		
1/4/89	19	DEC '88	12/31/88	15	4	260,848,800	2,188,500	0.115184	(460,737)	1,727,763	0.115184
1/4/89			12/31/88		-4	260,848,800			460,737		
1/31/89	27	JAN	1/31/89	31	0	264,209,800	3,361,000	0.124481	0	3,821,737	0.123262
1/31/89			1/31/89		0	264,209,800			0		
2/21/89	21	FEB	2/28/89	28	-7	266,743,000	2,533,200	0.120629	795,240	3,328,440	0.118873
2/21/89			2/28/89		7	266,743,000			(795,240)		
3/28/89	35	MAR	3/31/89	31	-3	270,719,200	3,976,200	0.113606	353,419	3,534,379	0.114012
3/28/89			3/31/89		3	270,719,200			(353,419)		
4/29/89	32	APR	4/30/89	30	-1	274,489,000	3,769,800	0.117806	144,689	3,561,070	0.118702
4/29/89			4/30/89		1	274,489,000			(144,689)		
5/26/89	27	MAY	5/31/89	31	-5	278,395,600	3,906,600	0.144689	760,532	4,522,443	0.145885
5/26/89			5/31/89		5	278,395,600			(760,532)		
6/26/89	31	JUN	6/30/89	30	-4	283,110,900	4,715,300	0.152106	900,219	4,854,987	0.161833
6/26/89			6/30/89		4	283,110,900			(900,219)		
7/27/89	31	JUL	7/31/89	31	-4	290,087,600	6,976,700	0.225055	528,544	6,605,025	0.213065
7/27/89			7/31/89		4	290,087,600			(528,544)		
8/21/89	25	AUG	8/31/89	31	-10	293,391,000	3,303,400	0.132136	1,165,733	3,940,589	0.127116
8/21/89			8/31/89		10	293,391,000			(1,165,733)		
10/5/89	45	SEP	9/30/89	30	5	298,636,800	5,245,800	0.116573	(582,867)	3,497,200	0.116573
10/5/89			9/30/89		-5	298,636,800			582,867		
11/3/89	29	OCT	10/31/89	31	3	301,972,800	3,336,000	0.115034	(345,103)	3,573,763	0.115283
11/3/89			10/31/89		-3	301,972,800			345,103		
11/30/89	27	NOV	11/30/89	30	0	305,019,800	3,047,000	0.112852	0	3,392,103	0.113070
11/30/89			11/30/89		0	305,019,800			0		
12/20/89	20	DEC	12/31/89	31	-11	307,154,400	2,134,600	0.106730	1,352,670	3,487,270	0.112493
12/20/89			12/31/89		11	307,154,400			(1,352,670)		
1/9/90	20	JAN '90	1/9/90	9	0	309,613,800	2,459,400	0.122970	0	1,106,730	0.122970
TOTALS	365	1989		365	-11	46,345,600	46,345,600	0.127000	1,813,407	48,119,007	0.131833
									46,345,600		
					MAX:	0.213065	MIN:	0.112493	48,119,007	0.131833	

- 13 -

4K 7-25-90 B.P.

1989 AWUDS Monthly and Yearly Water-Use Calculations Worksheet

Facility Name: EKLUTNA UTILITIES, INC. THUNDERBIRD HEIGHTS SUBD. IN-HOUSE

File Type and Number: ADL 210807 Sequence Number: 01 W

REPORT DATE	ACTUAL DAYS	MONTH	MONTH DATES	NORMAL DAYS	DAY FACTOR	METER READING	GALLONS	MGD	ADJUSTED GALLONS	NEW GALLONS	ADJUSTED MGD
12/20/88			12/20/88		0	39,722,900			0		
12/23/88	3	DEC '88	12/31/88	11	-8	41,149,800	1,426,900	0.475633	1,088,859	2,515,759	0.228705
12/23/88			12/31/88		8	41,149,800			(1,088,859)		
		JAN	1/31/89	31				0.136107	0	0	0.136662
			1/31/89						0		
		FEB	2/28/89	28			0	0.136107	0	0	0.136662
			2/28/89						0		
		MAR	3/31/89	31			0	0.136107	0	0	0.136662
			3/31/89						0		
4/24/89	122	APR	4/30/89	30	-6	57,754,900	16,605,100	0.136107	883,200	16,399,441	0.136662
4/24/89			4/30/89		6	57,754,900			(883,200)		
5/18/89	24	MAY	5/31/89	31	-13	61,287,700	3,532,800	0.147200	1,760,702	4,410,302	0.142268
5/18/89			5/31/89		13	61,287,700			(1,760,702)		
7/14/89	57	JUN	6/30/89	30	14	69,007,700	7,720,000	0.135439	(1,896,140)	4,063,158	0.135439
7/14/89			6/30/89		-14	69,007,700			1,896,140		
		JUL	7/31/89	31				0.000000	0	0	0.137183
			7/31/89						0		
		AUG	8/31/89	31			0	0.000000	0	0	0.137183
			8/31/89						0		
		SEP	9/30/89	30			0	0.000000	0	0	0.137183
			9/30/89						0		
		OCT	10/31/89	31			0	0.000000	0	0	0.137183
			10/31/89						0		
		NOV	11/30/89	30			0	0.000000	0	0	0.137183
			11/30/89						0		
12/20/89	159	DEC	12/31/89	31	-11	90,808,300	21,800,600	0.137111	1,544,924	25,241,664	0.137183
12/20/89			12/31/89		11	90,808,300			(1,544,924)		
1/31/90	42	JAN '90	1/31/90	31	0	96,707,100	5,898,800	0.140448	0	4,353,876	0.140448
TOTALS:	362			365	-3	49,658,500	49,658,500	0.137178	456,065	50,114,565	0.137300
		1989							49,658,500		
					MAX:	0.142268	MIN:	0.135439	50,114,565	0.137300	

UA
1-20-90
D.P.

1989 AWUDS Monthly and Yearly Water-Use Calculations Worksheet

Facility Name: EXLUSIVE UTILITIES, INC. THUNDERBIRD HEIGHTS SUBD. ACROSS RIVER

File Type and Number: LAS 2811 Sequence Number: 01 W WELL

REPORT DATE	ACTUAL DAYS	MONTH	MONTH DATES	NORMAL DAYS	DAY FACTOR	METER READING	GALLONS	MGD	ADJUSTED GALLONS	NEW GALLONS	ADJUSTED MGD
12/20/88			12/20/88		0	7,351,400			0		
12/23/88	3	DEC '88	12/31/88	11	-8	7,675,000	323,600	0.107867	206,846	530,446	0.048222
12/23/88			12/31/88		8	7,675,000			(206,846)		
		JAN	1/31/89	31				0.025856	0	0	0.025585
			1/31/89						0		
		FEB	2/28/89	28			0	0.025856	0	0	0.025585
			2/28/89						0		
		MAR	3/31/89	31			0	0.025856	0	0	0.025585
			3/31/89						0		
4/24/89	122	APR	4/30/89	30	-6	10,829,400	3,154,400	0.025856	122,700	3,070,254	0.025585
4/24/89			4/30/89		6	10,829,400			(122,700)		
5/18/89	24	MAY	5/31/89	31	-13	11,320,200	490,800	0.020450	379,828	747,928	0.024127
5/18/89			5/31/89		13	11,320,200			(379,828)		
7/14/89	57	JUN	6/30/89	30	14	12,985,600	1,665,400	0.029218	(409,046)	876,526	0.029218
7/14/89			6/30/89		-14	12,985,600			409,046		
		JUL	7/31/89	31				0.000000	0	0	0.033875
			7/31/89						0		
		AUG	8/31/89	31			0	0.000000	0	0	0.033875
			8/31/89						0		
		SEP	9/30/89	30			0	0.000000	0	0	0.033875
			9/30/89						0		
		OCT	10/31/89	31			0	0.000000	0	0	0.033875
			10/31/89						0		
		NOV	11/30/89	30			0	0.000000	0	0	0.033875
			11/30/89						0		
12/20/89	159	DEC	12/31/89	31	-11	18,561,400	5,575,800	0.035068	248,076	6,232,922	0.033875
12/20/89			12/31/89		11	18,561,400			(248,076)		
1/31/90	42	JAN '90	1/31/90	31	0	19,508,600	947,200	0.022552	0	699,124	0.022552
TOTALS:	362			365	-3	10,886,400	10,886,400	0.030073	41,230	10,927,630	0.029939
		1989							10,886,400		
					MAX:	0.033875	MIN:	0.024127	10,927,630	0.029939	

UA
1-20-90
B.P.

1990 AKWUDS Monthly and Yearly Water-Use Calculations Worksheet

Facility Name: ERU, INC. HYLENCREST SUBDIVISION

File Type and Number: LAS 1059 Sequence Number: 01 W

REPORT DATE	ACTUAL DAYS	MONTH	MONTH DATES	NORMAL DAYS	DAY FACTOR	METER READING	GALLONS	MGD	ADJUSTED GALLONS	NEW GALLONS	ADJUSTED MGD
~~12/3/89~~			~~11/30/89~~		~~-3~~	?			~~0~~		
1/10/90	38	DEC '89	12/31/89	31	10	?	275,200	0.007242	(72,421)	202,779	0.006541
~~1/10/90~~			~~12/31/89~~		~~-10~~	?			~~72,421~~		
1/30/90	20	JAN	1/31/90	31	-1	?	124,600	0.006230	6,758	203,779	0.006574
~~1/30/90~~			~~1/31/90~~		~~1~~	?			~~(6,758)~~		
3/4/90	33	FEB	2/28/90	28	4	?	223,000	0.006758	(27,030)	189,212	0.006758
~~3/4/90~~			~~2/28/90~~		~~-4~~	?			~~27,030~~		
4/8/90	35	MAR	3/31/90	31	8	?	224,000	0.006400	(51,300)	199,836	0.006446
~~4/8/90~~			~~3/31/90~~		~~-8~~	?			~~51,300~~		
5/2/90	24	APR	4/30/90	30	2	?	185,100	0.007713	(15,425)	220,875	0.007363
~~5/2/90~~			~~4/30/90~~		~~-2~~	?			~~15,425~~		
5/28/90	26	MAY	5/31/90	31	-3	?	300,600	0.011562	38,572	354,697	0.011442
~~5/28/90~~			~~5/31/90~~		~~3~~	?			(36,572)		
7/10/90	43	JUN	6/30/90	30	10	?	554,300	0.012891	(128,907)	386,721	0.012891
~~7/10/90~~			~~6/30/90~~		~~-10~~	?			~~128,907~~		
8/1/90	22	JUL	7/31/90	31	1	?	349,000	0.015864	(15,864)	462,043	0.014905
~~8/1/90~~			~~7/31/90~~		~~-1~~	?			~~15,864~~		
9/10/90	40	AUG	8/31/90	31	10	?	364,900	0.009123	(91,225)	289,539	0.009340
~~9/10/90~~			~~8/31/90~~		~~-10~~	?			~~91,225~~		
10/1/90	21	SEP	9/30/90	30	1	?	147,700	0.007033	(7,033)	231,892	0.007730
~~10/1/90~~			~~9/30/90~~		~~-1~~	?			~~7,033~~		
		OCT	10/31/90	31	-31	?		0.004363	135,250	142,283	0.004590
			~~10/31/90~~		~~-30~~	?			~~130,687~~		
12/2/90	62	NOV	11/30/90	30	2	?	270,500	0.004363	(8,726)	122,161	0.004072
~~12/2/90~~			~~11/30/90~~		~~-2~~	?			~~8,726~~		
1/13/91	42	DEC	12/31/90	31	13	?	551,500	0.013131	(170,702)	399,523	0.012565
1/13/91			12/31/90		-13	?			170,702		
?	0	JAN '91	1/31/91	31	0	?	0	0.000000	0	170,702	0.005507
TOTALS:	368			365	~~-54~~		0 3,295,200	0.008954	167,856	3,132,556	0.008747
		1990							3,295,200		
					MAX:	0.014905	MIN:	0.004072	3,463,056	0.008747	

1990 AKWUDS Monthly and Yearly Water-Use Calculations Worksheet

Facility Name: HILLSIDE PARK SUBDIVISION M-W DRILLING

File Type and Number: (ADL 202909) LAS731 Sequence Number: 01 W

REPORT DATE	ACTUAL DAYS	MONTH	MONTH DATES	NORMAL DAYS	DAY FACTOR	METER READING	GALLONS	MGD	ADJUSTED GALLONS	NEW GALLONS	ADJUSTED MGD
12/4/89			11/30/89		-4	?	475,200		0		
1/9/90	36	DEC '89	12/31/89	31	9	?	697,200	0.019367	(174,300)	522,900	0.016686
1/9/90			12/31/89		-9	?			174,300		
2/7/90	29	JAN	1/31/90	31	7	?	567,600	0.019572	(137,307)	604,893	0.019513
2/7/90			1/31/90		-7	?			137,307		
3/2/90	23	FEB	2/28/90	28	2	?	459,600	0.019983	(39,965)	556,642	0.019880
3/2/90			2/28/90		-2	?			39,965		
4/6/90	35	MAR	3/31/90	31	6	?	700,800	0.020023	(180,137)	620,628	0.020020
4/6/90			3/31/90		-6	?			180,137		
5/3/90	27	APR	4/30/90	30	3	?	585,600	0.021689	(65,067)	640,670	0.021356
5/3/90			4/30/90		-3	?			65,067		
6/10/90	38	MAY	5/31/90	31	10	?	979,200	0.025768	(257,584)	786,582	0.025374
6/10/90			5/31/90		-10	?			257,584		
7/2/90	22	JUN	6/30/90	30	2	?	639,600	0.029073	(58,145)	839,139	0.027971
7/2/90			6/30/90		-2	?			58,145		
8/14/90	43	JUL	7/31/90	31	14	?	1,536,720	0.035738	(500,327)	1,094,538	0.035308
8/14/90			7/31/90		-14	?			500,327		
9/6/90	23	AUG	8/31/90	31	6	?	623,580	0.027112	(162,573)	951,234	0.031008
9/6/90			8/31/90		-6	?			162,573		
10/2/90	26	SEP	9/30/90	30	2	?	642,960	0.024729	(43,458)	756,175	0.025206
10/2/90			9/30/90		-2	?			43,458		
11/5/90	34	OCT	10/31/90	31	0	?	767,220	0.022565	0	816,678	0.024344
11/5/90			10/31/90		0	?			0		
?	0	NOV	11/30/90	30	0	?	0	0.000000	0	0	0.000000
?			11/30/90		0	?			0		
?	0	DEC	12/31/90	31	0	?	0	0.000000	0	0	0.000000
?			12/31/90		0	?			0		
?	0	JAN '91	1/31/91	31	0	?	0	0.000000	0	0	0.000000
TOTALS:	300			365	-9	0	7,502,880	0.025010	174,300	7,677,180	0.021033
		1990							7,502,880		
					MAX:	0.035308	MIN:	0.000000	7,677,180	0.021033	

1990 AMUDS Monthly and Yearly Water-Use Calculations Worksheet

Facility Name: NORFOLK UTILITIES EAGLE RIVER

File Type and Number: ADL 209376 Sequence Number: 01 W

REPORT DATE	ACTUAL DAYS	MONTH	MONTH DATES	NORMAL DAYS	DAY FACTOR	METER READING	GALLONS	MGD	ADJUSTED GALLONS	NEW GALLONS	ADJUSTED MGD
12/29/89			12/29/89		0	11,699,000			0		
1/2/90	4	DEC '89	12/31/89	2	2	12,468,200	769,200	0.192300	(364,600)	384,600	0.192300
1/2/90			12/31/89		-2	12,468,200			364,600		
1/30/90	28	JAN	1/31/90	31	-1	17,474,600	5,006,400	0.178800	179,514	5,570,514	0.179694
1/30/90			1/31/90		1	17,474,600			(179,514)		
2/28/90	29	FEB	2/28/90	28	0	22,680,500	5,205,900	0.179514	0	5,026,386	0.173514
2/28/90			2/28/90		0	22,680,500			0		
4/2/90	33	MAR	3/31/90	31	2	28,590,900	5,910,400	0.179103	(359,206)	5,552,194	0.179103
4/2/90			3/31/90		-2	28,590,900			359,206		
4/30/90	28	APR	4/30/90	30	0	34,457,000	5,866,100	0.209504	0	6,224,306	0.207477
4/30/90			4/30/90		0	34,457,000			0		
5/31/90	31	MAY	5/31/90	31	0	42,061,600	7,604,600	0.245310	0	7,604,600	0.245310
5/31/90			5/31/90		0	42,061,600			0		
6/29/90	29	JUN	6/30/90	30	-1	49,715,100	7,653,500	0.263914	408,481	8,061,981	0.268733
6/29/90			6/30/90		1	49,715,100			(408,481)		
7/30/90	31	JUL	7/31/90	31	-1	62,378,000	12,662,900	0.408481	249,919	12,504,339	0.403566
7/30/90			7/31/90		1	62,378,000			(249,919)		
8/30/90	31	AUG	8/31/90	31	-1	70,125,500	7,747,500	0.249919	181,631	7,679,212	0.247717
8/30/90			8/31/90		1	70,125,500			(181,631)		
10/1/90	32	SEP	9/30/90	30	1	75,937,700	5,812,200	0.181631	(181,631)	5,448,338	0.181631
10/1/90			9/30/90		-1	75,937,700			181,631		
10/29/90	28	OCT	10/31/90	31	-2	80,833,700	4,896,000	0.174857	347,019	5,424,650	0.174989
10/29/90			10/31/90		2	80,833,700			(347,019)		
11/30/90	32	NOV	11/30/90	30	0	86,386,000	5,552,300	0.173509	0	5,205,281	0.173509
11/30/90			11/30/90		0	86,386,000			0		
1/2/91	33	DEC	12/31/90	31	2	92,420,600	6,034,600	0.182867	(365,733)	5,668,867	0.182867
1/2/91			12/31/90		-2	92,420,600			365,733		
2/1/91	30	JAN '91	1/31/91	31	1	97,689,200	5,268,600	0.175620	(175,620)	5,458,713	0.176008
TOTALS:	365	1990		365	0	79,952,400	79,952,400	0.219000	18,867	79,971,267	0.219039
									79,952,400		
					MAX:	0.403366	MIN:	0.173509	79,971,267	0.219039	

1990 AKWUDS Monthly and Yearly Water-Use Calculations Worksheet

Facility Name: SOUTHPARK TERRACE SUBDIVISION

File Type and Number: ADL 209628-P Sequence Number: 01 W

REPORT DATE	ACTUAL DAYS	MONTH	MONTH DATES	NORMAL DAYS	DAY FACTOR	METER READING	GALLONS	MGD	ADJUSTED GALLONS	NEW GALLONS	ADJUSTED MGD
12/6/89			11/30/89		-6	38,580,400			0		
1/9/90	34	DEC '89	12/31/89	31	9	39,229,600	649,200	0.019094	(171,847)	477,353	0.015398
1/9/90			12/31/89		-9	39,229,600			171,847		
2/5/90	27	JAN	1/31/90	31	5	39,705,000	475,400	0.017607	(88,037)	559,210	0.018039
2/5/90			1/31/90		-5	39,705,000			88,037		
3/3/90	26	FEB	2/28/90	28	3	40,205,900	500,900	0.019265	(57,796)	531,141	0.018969
3/3/90			2/28/90		-3	40,205,900			57,796		
4/4/90	32	MAR	3/31/90	31	4	40,885,000	679,100	0.021222	(84,388)	652,009	0.021033
4/4/90			3/31/90		-4	40,885,000			84,388		
5/3/90	29	APR	4/30/90	30	3	41,447,900	562,900	0.019410	(58,231)	589,556	0.019652
5/3/90			4/30/90		-3	41,447,900			58,231		
6/1/90	29	MAY	5/31/90	31	1	42,376,200	928,300	0.032010	(32,010)	954,521	0.030791
6/1/90			5/31/90		-1	42,376,200			32,010		
6/29/90	28	JUN	6/30/90	30	-1	43,448,400	1,072,200	0.038293	45,718	1,149,928	0.038331
6/29/90			6/30/90		1	43,448,400			(45,718)		
8/2/90	34	JUL	7/31/90	31	2	45,002,800	1,554,400	0.045718	(91,435)	1,417,247	0.045718
8/2/90			7/31/90		-2	45,002,800			91,435		
9/4/90	33	AUG	8/31/90	31	4	46,078,600	1,075,800	0.032600	(130,400)	1,036,835	0.033446
9/4/90			8/31/90		-4	46,078,600			130,400		
10/2/90	28	SEP	9/30/90	30	2	46,689,800	611,200	0.021829	(43,557)	697,843	0.023265
10/2/90			9/30/90		-2	46,689,800			43,557		
11/2/90	31	OCT	10/31/90	31	2	47,364,900	675,100	0.021777	(43,555)	675,203	0.021781
11/2/90			10/31/90		-2	47,364,900			43,555		
12/10/90	38	NOV	11/30/90	30	10	48,178,300	813,400	0.021405	(214,053)	642,902	0.021430
12/10/90			11/30/90		-10	48,178,300			214,053		
1/8/91	29	DEC	12/31/90	31	8	48,757,800	579,500	0.019983	(153,362)	633,691	0.020442
1/8/91			12/31/90		-8	48,757,800			153,362		
1/23/91	15	JAN '91	1/31/91	31	-8	49,049,700	291,900	0.019460	0	451,762	0.014573
TOTALS:	364			365	-1	9,528,200	9,528,200	0.026178	11,385	9,540,185	0.026137
		1990							9,528,200		
					MAX:	0.045718	MIN:	0.018039	9,540,185	0.026137	

1990 AKWUDS Monthly and Yearly Water-Use Calculations Worksheet

Facility Name: SOUTH-CENTRAL UTILITIES (COUNTRY LANE ESTATES)

File Type and Number: LAS 6515, 7212 Sequence Number: 01 W

REPORT DATE	ACTUAL DAYS	MONTH	MONTH DATES	NORMAL DAYS	DAY FACTOR	METER READING	GALLONS	MGD	ADJUSTED GALLONS	NEW GALLONS	ADJUSTED MGD
12/4/89			11/30/89		-4	7,576,500			0		
1/11/90	38	DEC '89	12/31/89	31	11	7,988,100	411,600	0.010832	(119.147)	292,453	0.009434
1/11/90			12/31/89		-11	7,988,100			119.147		
2/6/90	26	JAN	1/31/90	31	6	8,268,100	280,000	0.010769	(64.515)	334,532	0.010791
2/6/90			1/31/90		-6	8,268,100			64.515		
3/15/90	37	FEB	2/28/90	28	15	8,653,400	385,300	0.010414	(156.203)	293,713	0.010490
3/15/90			2/28/90		-15	8,653,400			156.203		
4/5/90	21	MAR	3/31/90	31	5	8,867,600	214,200	0.010200	(51.000)	319,403	0.010303
4/5/90			3/31/90		-5	8,867,600			51.000		
5/4/90	29	APR	4/30/90	30	4	9,178,200	310,600	0.010710	(42.341)	318,759	0.010625
5/4/90			4/30/90		-4	9,178,200			42.341		
6/7/90	34	MAY	5/31/90	31	7	9,605,100	426,900	0.012556	(87.391)	331,850	0.012318
6/7/90			5/31/90		-7	9,605,100			87.391		
7/2/90	25	JUN	6/30/90	30	2	9,975,600	370,500	0.014820	(29.640)	438,751	0.014292
7/2/90			6/30/90		-2	9,975,600			29.640		
8/10/90	39	JUL	7/31/90	31	10	10,605,200	629,600	0.016144	(161.436)	497,804	0.016058
8/10/90			7/31/90		-10	10,605,200			161.436		
9/5/90	26	AUG	8/31/90	31	0	10,932,600	327,400	0.012592	0	488,836	0.015769
9/5/90			8/31/90		0	10,932,600			0		
?	0	SEP	9/30/90	30	0	?	(10,932,600)	0.000000	0	(10,932,600)	-0.364420
?			9/30/90		0 ?				0		
?	0	OCT	10/31/90	31	0	?	0	0.000000	0	0	0.000000
?			10/31/90		0 ?				0		
?	0	NOV	11/30/90	30	0	?	0	0.000000	0	0	0.000000
?			11/30/90		0 ?				0		
?	0	DEC	12/31/90	31	0	?	0	0.000000	0	0	0.000000
?			12/31/90		0 ?				0		
?	0	JAN '91	1/31/91	31	0	?	0	0.000000	0	0	0.000000
TOTALS:	237			365	-11	(7,988,100)	(7,988,100)	(0.033705)	113.147	(7,868,353)	-0.021559
		1990				2,944,500		.012424	(7,938,100)		
					MAX:	0.016058	MIN:	-0.364420	(7,868,353)	-0.021559	

1990 AKWUDS Monthly and Yearly Water-Use Calculations Worksh

VIEWPOINT VENTURES, INC.

Facility Name: (POTTER VALLEY WATER SERVICE COMPANY) WELL #1

File Type and Number: ADL 210076 Sequence # : 01 W

DATE	DAYS	GPM	GALLONS	MGD	MONTH
12/28/89	-	-	-	-	-
		-	-	-	JAN
		-	-	-	FEB
		-	-	-	MAR
		-	-	-	APR
		-	-	-	MAY
		-	-	-	JUN
		-	-	-	JUL
		-	-	-	AUG
		-	-	-	SEP
		-	-	-	OCT
		-	-	-	NOV
12/28/90	365	72.0	3,378,240	0.009255	DEC
TOTALS:	365	72	3,378,240	0.009255	
	AVG GPM	72.0			1990
	MAX:	0.009255	MIN:	0.000000	

UTILITY: Anchorage Water and Wastewater Utility (AWWU)

CONTACTS

1) Dennis Saathoff, 564-2705
2) Eric Linboe, 338-3870
3) Mary Collins, MOA Statistics, 343-4222
4) Al Showalter, Municipal Light and Power, 337-7812

WATER SOURCES

1) Surface Water
   a) Ship Creek was the main source of water for the MOA in 1990. Water is withdrawn at a dam located at the mouth of a canyon on the edge of the Chugach Mountains. Fort Richardson also withdraws water for public supply at this point.
   b) Eklutna Reservoir is a new source of water for the MOA with the potential of becoming the main source in the future.
2) Ground Water

   During calendar year 1990, the MOA pumped 19 wells. Only the Service-Hanshew well was pumped full-time for public supply during 1990. The remaining 18 wells were all in standby status. Twelve wells were used intermittently for public supply and the remaining 6 pumped for maintenance purposes only. The MOA is tending away from groundwater sources at this time.

WITHDRAWALS

Period of reported withdrawals is calendar year 1990. Reported withdrawals are as follows:

Surface Water	Gallons	MGD
Ship Creek	4,573,071,053	
Eklutna Lake	3,334,954,000	
Total SW	**7,908,025,053**	**21.67**
Ground Water		
Well Total	**789,396,300**	**2.16**
TOTAL	**8,697,421,353**	**23.83**

DELIVERIES

Residential

	Accounts	MG W-U per Account/yr.	W-U (MG)	MGD
Metered	3,975	-	1,648.333	
Flat	33,777	.084	2,837.268	
Total	37,752		4,485.601	**12.29**

Data taken from AWWU Grand Totals by Revenue Code 1990 summary sheet. Flat rate accounts did not have W-U quantities associated. These amounts were estimated using the statistic from the MOA of 7,000 gallons per month per customer.

Commercial and Industrial

	Accounts	Yearly W-U (MG)	MG W-U per Account/yr.
Metered	3,116	1,937.132	.621673
Flat	81	50.356	.621673 est.
Total	3,197	1,987.488	.621673

Data taken from AWWU Grand Totals by Revenue Code 1990 summary sheet. Commercial and Industrial accounts were categorically lumped together except for construction W-U which comes under the industrial category. Flat rate accounts did not have W-U quantities associated. These amounts were estimated using the W-U average for metered accounts.

Commercial and industrial category W-U was estimated 2/3 commercial and 1/3 industrial.
Commercial = 2/3 X 1,987.488 MG = 1,324.992 MG / 365 = **3.63 MGD**
Industrial = 1/3 X 1,987.488 MG = 662.496 MG

Data taken from AWWU Grand Totals by Revenue Code 1990 summary sheet:

Industrial

	Accounts	MG W-U per Account/yr.	Estimated W-U (MG)	MGD
Construction (CN)	11	.631673 est.	6.838	
Est. from above	1,066	.631673 est.	662.496	
Total	**1,077**	**.631673 est.**	**669.334**	**1.83**

Type	MGD
Domestic	12.29
Commercial	3.63
Industrial	1.83
Fossil Fuel	0.39
Total	**18.14**

POPULATION SERVED

The total population served was taken from an AWWU Water and Wastewater Statistics 1990 pamphlet. The surface and ground water populations served then were estimated analogously to their respective percentage of their withdrawals to total withdrawals.

	MGD	% of Total W-U	Population Served
GW	**2.16**	9.06	**16,769**
SW	**21.67**	90.94	**168,231**
Total	**23.83**	100.00	**185,000**

FOSSIL FUEL POWER GENERATION

Anchorage Municipal Light and Power uses water from the Eklutna pipeline for generator cooling, gas turbines, and boilers. The average amount of water it uses per day is 390,000 gallons per day.

SEWAGE TREATMENT

Three wastewater treatment facilities are owned and operated by AWWU.

Facility	Average Discharge MGD	Treatment Type
Anchorage	33.45	Primary
Eagle River	1.01	Secondary
Girdwood	.32	Tertiary
Total	**34.78**	

Data taken from AWWU Operations Division, Water and Wastewater Treatment Sections, Annual Report, 1990.

FACTS and CALCULATIONS

1) There are no nuclear power electrical generators in southcentral Alaska.
2) The ratio of total estimated deliveries to total reported withdrawals is 18.14 MGD / 23.83 MGD = 76.1 percent.
3) The total estimated conveyance losses for the city system are 23.83 MGD - 18.14 MGD = 5.69 MGD. The accuracy of these losses have not been confirmed.
4) The average per capita use is:
   23.83 MGD / 185,000 capita = 129 gallons per capita per day
   The estimated average residential use per capita per day is:
   12,290,000 gallons per day / 185,000 people = 66 gallons per person per day.

COMPARISON OF 1985 TO 1990 SUMMARIES

1) AWWU is the main utility serving the Anchorage Bowl. W-U data from Elmendorf Air Force Base, Fort Richardson Army Base and various other small public water suppliers will be aggregated together with data from AWWU on another summary sheet. On that sheet there will be a comparison of data from those two years.

ANCH., MUNI. - AWWU

ESTIMATED USE OF WATER IN THE UNITED STATES
1990 - DATA COLLECTION FORM - 1990

68/6/7

COUNTY or HUC NAME _____ COUNTY or HUC CODE _____ TOTAL POPULATION _____
(in thousands)

* UNITS IN MGD TO TWO DECIMAL PLACES (UNLESS OTHERWISE SPECIFIED)

	WATER SUPPLY	DOMESTIC	COMMERCIAL	INDUSTRIAL	MINING	FOSSIL FUEL	NUCLEAR	HYDROELECTRIC	LIVESTOCK	ANIMAL SPECIALTIES	IRRIGATION	SEWAGE TRMT.	RESERVOIR EVAP
Total Water Use													
GW Withdrawals - Fresh	2.16												
GW Withdrawals - Saline	—												
SW Withdrawals - Fresh	21.67												
SW Withdrawals - Saline	—												
GW - Population Served (thous.)	16.77												
SW - Population Served (thous.)	168.23												
Deliveries from Water Supply:		12.29	3.63	1.83		.39	—						
Consumptive Use - Fresh													
Consumptive Use - Saline													
Conveyance Loss													
Power Generation (GWh)													
Acres Irrigated - Sprayed (thous.)													
Acres Irrigated - Flooded (thous.)													
Number of Facilities													
# Facilities in WU Database												3	
WW total returns from municipal fac.												34.78	
# of Public WW Facilities												3	
# Industrial & Other WW Facilities													
Reclaimed Sewage													

ANCH. MUNI. LIGHT & POWER

SOURCE: AWWU WATER, EKLUTNA OR SHIP CREEK
PLANT MGR: AL SHOWALTER, 337-7812

GAS TURBINES/BOILERS W/OIL BACKUP
OTHER MUNI. POWER GENERATOR IS CONTINUED SYSTEM

ESTIMATED USE OF WATER IN THE UNITED STATES
1990 – DATA COLLECTION FORM – 1990

68/6/12

COUNTY or HUC NAME _____ COUNTY or HUC CODE _____ TOTAL POPULATION _____
(in thousands)

* UNITS IN MGD TO TWO DECIMAL PLACES (UNLESS OTHERWISE SPECIFIED)

	WATER SUPPLY	DOMESTIC	COMMERCIAL	INDUSTRIAL	MINING	FOSSIL FUEL	NUCLEAR	HYDROELECTRIC	LIVESTOCK	ANIMAL SPECIALTIES	IRRIGATION	SEWAGE TRMT.	RESERVOIR EVAP
Total Water Use													
GW Withdrawals – Fresh													
GW Withdrawals – Saline													
SW Withdrawals – Fresh													
SW Withdrawals – Saline													
GW – Population Served (thous.)													
SW – Population Served (thous.)													
Deliveries from Water Supply:						.39	—						
Consumptive Use – Fresh													
Consumptive Use – Saline													
Conveyance Loss													
Power Generation (GWh)													
Acres Irrigated – Sprayed (thous.)													
Acres Irrigated – Flooded (thous.)													
Number of Facilities													
# Facilities in WU Database													
WW total returns from municipal fac.													
# of Public WW Facilities													
# Industrial & Other WW Facilities													
Reclaimed Sewage													

AWWU Water & Wastewater Statistics 1990

WASTEWATER

I. Pt. Woronzof Tr. Plant (Anchorage) ..... 58 MGD*
Average ..... 28 MGD
Eagle River Tr. Plant ..... 1 MGD
Average ..... .85 MGD
Girdwood Tr. Plant ..... .85 MGD
Average ..... .37 MGD

II. **Types of Treatment:**
Anchorage ..... Primary
Eagle River ..... Secondary
Girdwood ..... Tertiary

III. **Collection Systems:**
Pipe Size ..... 2" - 90"
Manholes 11,400
Interceptors ..... 35 miles
Trunks ..... 160 miles
Laterals ..... 440 miles

IV. **Customers:**
Total 46,000
Residential 90%
Commercial 10%

*MGD = Million Gallon per day

Questions (?) Call 564-2762

AWWU Water & Wastewater Statistics 1990

Demographic Data:
Service area ..... 125 Sq. mi.
Population Served 185,000

WATER

I. **Production Capacity:**
Ship Creek Tr. Plant ..... 24 MGD*
Eklutna Tr. Plant ..... 35 MGD
Operating Wells ..... 9.5 MGD

II. **Miscellaneous:**
Water Temp. Range ..... 44-48 degrees F.
Testing Samples ..... 25 daily

III. **Distribution:**
Total Reservoir Capacity ..... 48 MG**
Mains: ..... 650 miles
Pipe Size ..... 4" - 60"
Hydrants 5014

IV. **Consumption:**
Average Household (4) ..... 7000 GPM***
Total Customers 40,500
Total Residential ..... 34,020 ..... 84%
Total Commercial ..... 6,480 ..... 16%

*MGD = Million Gallon per day
**MG = Million Gallon
***GPM = Gallons per month

AWWU 1990 2-7-91

Talked to ERIC LINBOE 338-3870 concerning 267-4510, (cell # 244-4507) W-U. Only well totally committed to full time water supply during 1990 was Service Henshaw Well #29, 14,321,000 Gallons. It services 40-50 customers (3 people per customer). The rest of the wells are on standby and pumps one-2 hour time period per week to keep them developed. The only other time that they are used is during peak demand periods (of summer). It would be hard to quantify the amount used for consumption w/o looking through daily records for each well.

Mary Collins of ANCH. MUNI Statistics - 343-4222 Says:

AVG HOUSEHOLD = 2.68 people includes single and multi-family units

76,723 households in Anchorage in 1989

21.6% of all 1990 households are single individuals

ANCH., MUNI (AWWU)

Commercial & Industrial W-U

	Accounts	W-U (MG)	W-U/Acct. (MG)
Metered	3,116	1,937.132	.621673
Flat	81	50.356 ← EST.	.621673
TOTAL	3,197	1,987.488	.621673

Est. 1/3 Industrial, 2/3 Commercial $\frac{1}{3} \times 1{,}987.488$ MG

∴ Industrial = 662.496 MG ÷ 365 DAYS = 1.815 MGD

∴ Commercial = 1,324.992 MG ÷ 365 DAYS = **3.630 MGD**

Industrial Only

	Accounts	W-U/Acct (MG)	Est. W-U (MG)
Flat	11	.621673	6.838 MG ÷ 365 DAYS = .019 MGD

∴ Total Industrial Est. = (1.815 + .019) MGD = **1.834 MGD**

Residential

	Accounts	W-U (MG)	WU/Acct (MG)
Metered	3,975	1,648.333	
Flat	33,777	2,837.268 ←	.084
		4,485.601	

Multi-Family Resid

700 gal/month/Acct

∴ Residential = 4,485.601 MG ÷ 365 DAYS = 12.289 MGD

ANCHORAGE WATER AND WASTEWATER UTILITY

USGS MONTHLY PRODUCTION REPORT

DECEMBER

RECEIVED JAN 10 1991 Dept. of Natural Resources

	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE
WELL #1	0	0	0	0	0	0
WELL #3	1,776,300	7,457,200	2,023,500	193,500	755,900	1,040,800
WELL #4	4,695,600	6,949,200	7,444,300	337,700	502,200	3,313,100
WELL #7	945,000	11,340,000	7,246,000	1,777,000	2,035,000	1,768,000
WELL #9	3,354,500	10,682,100	1,879,900	907,200	1,131,200	2,766,100
WELL #10	5,185,000	5,783,000	975,000	4,219,000	12,760,000	21,722,000
WELL #11	4,988,000	1,793,000	890,000	2,097,000	7,511,000	20,024,000
WELL #12	2,879,000	15,341,000	5,921,000	448,000	2,195,000	5,554,000
WELL #13	2,477,100	4,577,700	594,000	21,321,000	33,066,000	60,687,000
WELL #20 CREEKSIDE	88,000 ← ok →	114,000	ok → 74,000	46,000	1,407,000	1,245,000
WELL #25 MILITARY #1	1,034,000	2,899,800	3,700,000	3,053,000	6,120,000	6,265,000
WELL #28 WINCHESTER	0	0	0	0	0	0
WELL #29 SERVICE HENSHEW	1,000,000	1,000,000	1,000,000	1,000,000	1,628,000	1,220,000
WELL #31 HUFFMAN HILLS	13,600	133,500	1,698,800	165,200	0	33,900
WELL #34 HOLLOWBROOK	70,400	115,300	225,500 ?.	171,500	800	1,205,000
WELL #35 ALAGCO	20,968,500	12,495,000	5,075,200	930,900	6,624,600	707,700
WELL #37 CAMPBELL LAKE	0	0	0	0	0	0
WELL #33 CALCO	12,200	471,100	3,177,400	258,400 ?.	304,300	202,000
WELL #41 TOWN & COUNTRY	0	0	0	0	0	0
WELL #42 WINDEMERE	0	0	0	0	0	0
SUB-TOTAL	49,487,200	81,591,100	42,922,600	36,925,400	76,041,000	127,713,600
EAGLE GLEN WEST	0	0	0	0	0	0
S.R. HEIGHTS NORTH	55,900	120,000	131,800 ?.	111,000	263,800	170,100
EAGLE CREST	30,800	20,200	252,900	41,600	78,000 ?.	33,800
PETERS CREEK (OBERG)	0	0	0	0	0	0
SUB-TOTAL	86,700	140,200	284,700	152,600	341,800	203,900
TOTAL WELLS	49,573,900	81,731,300	43,207,300	37,078,000	76,382,800	127,917,500
Y-T-D SUM - WELLS	49,573,900	130,865,200	174,072,500	211,150,500	287,535,300	415,450,300
EKLUTNA WTF	263,410,000	258,734,000	315,295,000	327,770,000	299,951,000	309,101,999
EKLUTNA WTF Y-T-D	263,410,000	522,144,000	837,439,000	1,165,209,000	1,465,160,000	1,774,261,999
SHIP CREEK WTF	350,770,158	278,374,993	345,183,327	334,329,997	374,320,831	373,871,334
SHIP CREEK WTF Y-T-D	350,770,158	629,145,156	974,328,483	1,308,658,480	1,682,979,311	2,056,850,645
SUB-TOTAL (SURFACE WATER)	614,180,158	537,108,993	660,478,327	662,099,997	674,271,831	682,972,334
TOTAL OF ALL SOURCES	663,754,058	618,400,298	703,685,627	699,177,997	750,654,631	810,809,834
Y-T-D SUMS OF ALL SOUR	663,754,058	1,282,154,356	1,985,839,983	2,685,017,980	3,435,672,611	4,246,567,445

cc: 0665 1/91

JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER	WELL #
0	0	0	0	0		1
2,118,700	329,200	221,500	96,800	119,700	67,900	3
5,617,400	279,000	114,530	99,800	183,800	17,900	4
21,621,000	1,482,000	352,000	251,000	229,000	443,000	7
3,349,600	28,400	10,030	4,297,300	936,900	71,100	9
58,732,000	12,310,000	1,650,030	132,000	111,000	6,311,000	10
44,937,000	10,700,000	84,000	15,000	84,000	813,000	11
33,847,000	6,808,000	9,078,000	5,610,000	942,000	549,000	12
50,034,600	21,069,000	6,930,000	0	2,229,000	0	13
1,503,000	55,000	66,000	37,000	19,000	8,000	20
10,858,000	1,439,000	5,434,000	1,982,000	0	1,331,000	25
0	0	0	0	0	0	28
1,974,000	1,224,000	985,000	1,169,000	1,155,000	963,000	29
10,699,800	2,246,600	599,400	441,700	74,200	0	31
1,719,100	614,400	0	0	0	0	34
2,972,000	450,500	439,700	364,700	455,400	365,800	35
0	0	0	0	0	0	37
1,667,200	248,200	0	243,700	310,900	245,200	38
0	0	0	0	0	0	41
0	0	0	0	0	0	42
251,650,400	62,233,300	25,964,100	14,740,000	6,852,900	11,185,900	SUBTOTAL
0	0	0	0	0	0	E.G.W.
63,100	186,200	137,700	166,700	145,100	136,500	E.R. HTS.
319,000	17,800	17,600	29,400	26,700	23,100	E. CREST
0	0	0	0	0	0	P. CRK.
382,100	204,000	155,300	196,100	171,800	159,600	SUBTOTAL
252,032,500	62,437,300	26,119,400	14,936,100	7,024,700	11,345,500	WELL TOT.
657,483,000	729,920,600	756,090,000	771,026,100	778,050,800	789,396,300	YTD.
332,165,000	761,084,000	469,954,000	174,032,000	155,135,000	168,023,000	
2,106,426,000	2,367,510,000	2,837,164,000	3,011,496,000	3,166,931,000	3,334,954,000	EKL - YTD
431,715,429	450,566,664	173,157,959	463,776,161	494,530,500	497,173,695	SHIP CK.
2,428,566,074	2,939,132,738	3,112,590,697	3,581,366,858	4,075,897,358	4,573,071,053	SHIP CK YTD
763,880,429	711,650,664	643,411,959	642,208,161	649,965,500	665,196,695	SW.
1,015,912,929	774,137,964	669,531,359	657,744,261	656,990,200	676,542,195	
5,262,475,374	6,036,613,338	6,706,144,697	7,363,883,958	8,020,879,158	8,697,421,353	

LLA	YEAR-TO-DATE	GPM	YEARLY GALLON EQUIVALENT OF 2 HRS. WEEKLY PUMPING FOR WELL DEVELOPMENT	PUBLIC SUPPLY	MONTHLY GALLON EQUIVALENT OF WEEKLY PUMPING FOR WELL DEVELOP.	REALISTIC TOTAL GALS. THOUGHT TO PUMP FOR WELL DEVELOP.
1	0	—				
3	17,101,000	1150	7,176,000	9,925,000	552,000	2,057,200
4	29,554,500	1800	11,232,000	18,322,500	864,000	1,534,900
7	49,429,000	2200	13,728,000	35,701,000	1,056,000	2,220,000
9	29,434,300	900	5,616,000	23,818,300	432,000	109,500
10	129,890,000	1500	9,360,000	120,530,000	720,000	243,000
11	93,936,000	1300	8,112,000	85,824,000	624,000	183,000
12	89,172,000	2300	14,352,000	74,820,000	1,104,000	1,939,000
13	202,985,400	1650	10,296,000	192,689,400	792,000	0
20	4,662,000	100	624,000	4,038,000	48,000	110,000
25	47,115,000	550	3,432,000	43,683,000	264,000	0
28	0	—	—	—	—	—
29	14,321,000	350	2,184,000	12,137,000	168,000	0
31	16,106,700	570	3,556,800	12,549,900	273,600	420,400
34	4,122,000	390	2,433,600	1,688,400	187,200	358,000
35	51,848,000	475	2,964,000	48,884,000	228,000	0
37	0	—	—	—	—	—
38	7,140,600	520	3,244,800	3,895,800	249,600	951,300
41	0	—	—	—	—	—
42	0	425	—	—	—	—
SUBTOTAL	726,817,500					
E.G.W.	0					
E.R. HTS.N	1,687,900	270	1,687,900	—	129,600	286,900
E. CREST	890,900	142	890,900	—	68,160	241,000
P. CRK.	0					
SUBTOTAL	2,578,800					
WELL TOT.	729,396,300		100,890,000	688,506,300		10,654,200. Well Development GW
YTD.	729,396,300					778,742,100 Public Supply GW
EKL - YTD	3,334,954,000					
SHIP CK.	3,334,954,000					
SHIP CK YTD	1,573,071,053					
SW	1,573,071,053					
	7,908,025,053					
	8,697,421,353					
	8,697,421,353					

GRAND TOTALS BY REVENUE CODE

ROUTE	CODE	NUMBER OF ACCOUNTS	MINM BILL	CURRENT CONSUMPTION 1,000's	CURRENT REVENUE	REVENUE ADJUSTMENTS	TAX	AVERAGE CONSUMPT	AVERAGE REVENUE	CONSUMPTION ADJUSTMENTS	YEAR-TO-DATE CONSUMPTION 1,000's	YEAR-TO-DATE REVENUE
----- WATER ----												
TOTAL	CM	3,116	277	165,633	422,091.26	799.20-	0.00	53	135.45		1,937,132 .001703 MG/customer	5,133,052.44
** TOTAL WATER REVENUE **				421,292.06		** TOTAL WATER USAGE **			165,633			
----- WATER ----												
TOTAL	RF	33,777	0	258	882,528.57	89.41-	0.00	0	26.12	258	14,006,476,410 gal 2.994 Test Meters ~250-300	10,539,938.61
** TOTAL WATER REVENUE **				882,439.16		** TOTAL WATER USAGE **			258			
----- SEWER ----												
TOTAL	RS	57,622	59	142,207	1232,281.58	1695.44-	0.00	2	21.38		1,620,906	13,914,297.76
-- FRANCHISE FEE -- 17,166.00												
** TOTAL SEWER REVENUE **				1,230,786.14		** TOTAL SEWER USAGE **			142,207			
----- WATER ----												
TOTAL	CF	81	0	0	6,906.89		0.00	0	85.27		50,355,485 GALO	103,091.40
** TOTAL WATER REVENUE **				6,906.89		** TOTAL WATER USAGE **			00			
----- SEWER ----												
TOTAL	CS	5,688	194	141,453	357,492.05	2684.93	0.00	24	62.84		1,670,672	4,033,523.74
-- FRANCHISE FEE -- 11,321.35												
** TOTAL SEWER REVENUE **				360,166.98		** TOTAL SEWER USAGE **			141,453			
----- WATER ----												
TOTAL	RM	3,975	91	143,006	414,596.47	41.82-	0.00	35	104.30		1,649,333	4,722,932.14
** TOTAL WATER REVENUE **				414,554.65		** TOTAL WATER USAGE **			143,006			
----- WATER ----												
TOTAL	CM	11	0	0	264.85		0.00	0	24.07		6,838,399 GALO	3,566.83
** TOTAL WATER REVENUE **				264.85		** TOTAL WATER USAGE **			00			
CONST.												

** NUMBER OF ACCOUNTS IN COLUMN 3 INCLUDES ONLY ACTIVE SERVICES (1,937,132+ 50,358)

CM - COMMERCIAL METERED
RF - RESIDENTIAL FLAT - (WATER)
RS - RESIDENTIAL SEWER (FLAT & METERED)
CF - COMMERCIAL FLAT
RM - RESIDENTIAL METERED

TOTAL COMM. = 1,987.487 MG = 5.45 MGD
RES. = 15,654.809 MG = 42.890 MGD
IND. = 6.838 MG = .019 MGD

Post-it™ brand fax transmittal memo 7671 | # of pages ▸ 1

To BILL PETERSEN	From DENNIS SAATHOFF
Co. GEOLOGICAL SURVEY	Co. AWWU
Dept.	Phone # 564-2705
Fax # 696-0772	Fax # 562-5427

AREA: Elmendorf Air Force Base (EAFB)

CONTACTS

1) Steve Flier, EAFB Environmental Planning, 552-4157
2) John Barber, Wastewater Treatment, 552-3024

Note: A verbal request for EAFB W-U information was made on February 1, 1991. This request was asked to be put in writing by Steve Flier and was sent on February 7, 1991. He said this request would be evaluated and prioritized by his supervisor but that I should not have high expectations for a response. As of this writing, a few subsequent calls have been made to request this data and have been unsuccessful.

WATER SOURCES and BACKGROUND

A dam on Ship Creek diverts water to the treatment plants of Fort Richardson and Anchorage Water and Wastewater Utility. Each treatment plant is unique. The Fort Richardson treatment plant then supplies water to Fort Richardson laundry, and general base use. Elmendorf Air Force Base is also supplied by the Fort Richardson treatment plant. This includes delivery to a hospital, some base housing, and general EAFB use. No residential water-use (W-U) data was available.

Information dated November 7, 1989 indicates 5 wells that have metering records available on them. These wells (#s 1, 2, 40, 42, and 43) are tied into the main water system whose source is delivered from the Fort Richardson Water Treatment Facility. An additional 16 wells are located at various facilities around the base. Individual metering records are not maintained for this group of wells. However, total production from all 16 wells averages 4,000 gallons per month.

POWER and HEAT GENERATION

A fossil fuel generating plant operates on EAFB. W-U quantities associated with its operation are unknown at this time. An estimate of W-U for this facility will be made based on the same amount used at Fort Richardson - .54 MGD.

WITHDRAWALS

Year	Treated SW Delivered from Fort Richardson	Well Water Withdrawals	Total Gallons
1985	860,839,000	172,239,000	1,033,078,000*
1986	1,112,198,000	88,642,000	1,200,840,000*
1987	1,128,644,000	80,542,000	1,209,186,000*
1988	836,114,000	126,475,000	962,589,000*
1989	1,005,378,822	104,708,000	1,110,086,822#
1990	1,000,210,115	Est.>100,000,000	1,100,210,115#

* Amount includes non-contact cooling groundwater.
\# Amount may include non-contact cooling groundwater.

The amount of water delivered to EAFB from Fort Richardson will be considered a withdrawal by EAFB - 1,000,210,115 gallons per year = 2.74 MGD.

Ground Water (gallons)	1988	1989	1990
Well 1	8,584,000	8,926,000	NA
Well 2	39,578,600	81,568,000	NA
Well 40	14,563,000	12,966,000	NA
Well 42	0	430,000	NA
Well 43	152,400	770,000	NA
16 Other Wells	Est.48,000	48,000	NA
GW Subtotal	**62,926,000**	**104,708,000**	**100,000,000**

DELIVERIES

SW from Fort Richardson Water Treatment Plant:

		1989	1990	
Line #18		346,098,000	288,907,000	
Line #20		602,045,000	643,999,000	
Line #21	Housing	36,612,000	35,959,000	
Line #22	Hospital	20,623,822	31,345,115	
SW Total		**1,005,378,822**	**1,000,210,115**	**= 2.74 MGD**

GW W-U is estimated at:

		Gallons	
	EAFB Wells	100,000,000	
GW Total		**100,000,000**	**= 0.27 MGD**

Domestic

Insufficient data on residential W-U exits to determine domestic deliveries. Therefore, all W-U will be considered commercial except power generation.

Commercial

		Gallons		
SW:	Base	1,000,210,115		
GW:	Wells	100,000,000	Estimated	
Total:		**1,100,210,115**	=	**3.01 MGD**

Power Generation

	gpm	gpd	MGD	
Non-consumptive:				
Steam Turbines	2700	3,888,000	3.89	Est.
Consumptive:				
Steam Turbines			0.54	Est.

POPULATION SERVED

Total Base Population: 9,037 (from the Alaska Department of Environmental Conservation, Public Water Supply Inventory, 1990)

On-Base Population: Using a similar ratio of base residents to total military personnel from Fort Richardson multiplied times the total base population.

Fort Richardson:	6.85 / 10.00	=	.685
Elmendorf:	9,037 X .685	=	6,190

GW - The percentage that GW was to the total amount of water withdrawn was multiplied times base population:

(0.27 / 3.01) X 6,190 = .09 X 6,190 = **555**

SW - A similar procedure for SW population served was performed as was for GW population served.

(2.74 / 3.01) X 6,190 = .91 X 6,190 = **5,635**

SEWAGE TREATMENT

According to EAFB wastewater treatment personnel, 95 percent of all wastewater is sent to the municipality for treatment. The average amount of effluent primarily treated on base in the sewage lagoon and discharged into Knik Arm is estimated at 100,000 gallons per month. That is equivalent to .003 MGD. Other small amounts are treated through leach fields and are not accounted.

FACTS and CALCULATIONS

1) Because the total amount of water delivered for domestic W-U is indeterminate, all withdrawals and deliveries will be considered commercial except for power generation.
2) Base population will be listed on the EUOWITUS Data Collection Form but the figure used for the Anchorage Bowl will be from the federal census, 226,338, which includes the populations of Fort Richardson and Elmendorf Air Force Base.
3) No data available to estimate conveyance losses between release and delivery points. Therefore, withdrawals equal deliveries.
4) The surface water deliveries to EAFB from Fort Richardson are accurate.
5) Estimate of groundwater W-U was estimated for all wells based on available historic data.

COMPARISON of 1990 EUOWITUS to 1985

1) The comparison between the two years data will be made after all the Anchorage area W-U data is aggregated from Fort Richardson, EAFB, Anchorage Water and Wastewater Utility, and various smaller utilities in the area.

ELMENDORF AIR FORCE BASE

ESTIMATED USE OF WATER IN THE UNITED STATES
1990 - DATA COLLECTION FORM - 1990

68/6/2

COUNTY or HUC NAME _____ COUNTY or HUC CODE _____ TOTAL POPULATION 9.04 (in thousands)

* UNITS IN MGD TO TWO DECIMAL PLACES (UNLESS OTHERWISE SPECIFIED)

	WATER SUPPLY	DOMESTIC	COMMERCIAL	INDUSTRIAL	MINING	FOSSIL FUEL	NUCLEAR	HYDROELECTRIC	LIVESTOCK	ANIMAL SPECIALTIES	IRRIGATION	SEWAGE TRMT.	RESERVOIR EVAP
Total Water Use													
GW Withdrawals - Fresh	.27												
GW Withdrawals - Saline	—												
SW Withdrawals - Fresh	2.74												
SW Withdrawals - Saline	—												
GW - Population Served (thous.)	.56												
SW - Population Served (thous.)	5.64												
Deliveries from Water Supply:			3.01			.54							
Consumptive Use - Fresh													
Consumptive Use - Saline													
Conveyance Loss													
Power Generation (GWh)													
Acres Irrigated - Sprayed (thous.)													
Acres Irrigated - Flooded (thous.)													
Number of Facilities													
# Facilities in WU Database													
WW total returns from municipal fac.													
# of Public WW Facilities													
# Industrial & Other WW Facilities													
Reclaimed Sewage													

22040 Maple St.
E.A.F.B. -3240.

/DEEV

To Bill P

Date 2-1 Time 9 A.M. P.M.

Asked for Powerplant Population information on 2-12-91 but Steve Flier (Fleer) said not to expect a reply for a minimum of 4-6 weeks. BP.

WHILE YOU WERE OUT

Of Steve Flier
EAFB - ENV. Planning
Phone 552 4157
Area Code Number Extension

~~TELEPHONED~~		PLEASE CALL	✓
CALLED TO SEE YOU		WILL CALL AGAIN	
WANTS TO SEE YOU		URGENT	
RETURNED YOUR CALL			

Message re: Survey of GW use
wants a letter requesting data + exactly what you need + want

Operator

ADAMS BUSINESS FORMS 9711

1990 AKWUDS Monthly and Yearly Water-Use Calculations Worksheet

Facility Name: U.S. DEPT. OF THE ARMY, FT. RICHARDSON #18 TO E.A.F.B.

File Type and Number: ADL 65557 Sequence # : 01 T

DATE	DAYS	METER READING	GALLONS	MGD	MONTH
12/31/89	-	-	-	-	-
1/31/90	31	-	24,866,000	0.802129	JAN
2/28/90	28	-	23,590,000	0.842500	FEB
3/31/90	31	-	25,991,000	0.838419	MAR
4/30/90	30	-	24,921,000	0.830700	APR
5/31/90	31	-	23,057,000	0.743774	MAY
6/30/90	30	-	25,869,000	0.862300	JUN
7/31/90	31	-	27,616,000	0.890839	JUL
8/31/90	31	-	22,612,000	0.729419	AUG
9/30/90	30	-	22,001,000	0.733367	SEP
10/31/90	31	-	22,684,000	0.731742	OCT
11/30/90	30	-	22,332,000	0.744400	NOV
12/31/90	31	-	23,368,000	0.753806	DEC
TOTALS:	365	-	288,907,000	0.7915e6	1990
MAX:		0.890839	MIN:	0.729419	

1990 AKWUDS Monthly and Yearly Water-Use Calculations Worksheet

Facility Name: U.S. DEPT. OF THE ARMY, FT. RICHARDSON #20 TO E.A.F.B.

File Type and Number: ADL 65557 Sequence # : 02 I

DATE	DAYS	METER READING	GALLONS	MGD	MONTH
12/31/89	-	-	-	-	-
1/31/90	31	-	52,395,000	1.690161	JAN
2/28/90	28	-	48,162,000	1.720071	FEB
3/31/90	31	-	53,723,000	1.733000	MAR
4/30/90	30	-	52,558,000	1.751933	APR
5/31/90	31	-	53,013,000	1.710097	MAY
6/30/90	30	-	57,143,000	1.904767	JUN
7/31/90	31	-	52,703,000	1.700097	JUL
8/31/90	31	-	51,086,000	1.647935	AUG
9/30/90	30	-	53,459,000	1.781967	SEP
10/31/90	31	-	53,803,000	1.735774	OCT
11/30/90	30	-	60,944,000	2.031467	NOV
12/31/90	31	-	55,004,000	1.774323	DEC
TOTALS:	365	-	643,989,000	1.764381	1990
	MAX:	2.031467	MIN:	1.647935	

1990 AKWUDS Monthly and Yearly Water-Use Calculations Worksheet

Facility Name: U.S. DEPT. OF THE ARMY, FT. RICHARDSON #21 TO E.A.F.B. HOUSING

File Type and Number: ADL 65557 Sequence # : 03 T

DATE	DAYS	METER READING	GALLONS	MGD	MONTH
12/31/89	-	-	-	-	-
1/31/90	31	-	2,924,000	0.034323	JAN
2/28/90	28	-	2,655,000	0.094821	FEB
3/31/90	31	-	2,873,000	0.092871	MAR
4/30/90	30	-	2,991,000	0.099700	APR
5/31/90	31	-	3,271,000	0.105516	MAY
6/30/90	30	-	3,747,000	0.124900	JUN
7/31/90	31	-	3,930,000	0.126774	JUL
8/31/90	31	-	2,842,000	0.091677	AUG
9/30/90	30	-	2,696,000	0.089867	SEP
10/31/90	31	-	2,648,000	0.085419	OCT
11/30/90	30	-	2,747,000	0.091567	NOV
12/31/90	31	-	2,629,000	0.084806	DEC
TOTALS:	365	-	35,959,000	0.098518	1990
MAX:		0.126774	MIN:	0.084806	

1990 AKWUDS Monthly and Yearly Water-Use Calculations Worksheet

Facility Name: U.S. DEPT. OF THE ARMY, FT. RICHARDSON #22 TO E.A.F.B. HOSPITA

File Type and Number: ADL 65557 Sequence # : 04 T

DATE	DAYS	METER READING	GALLONS	MGD	MONTH
12/31/89	-	-	-	-	-
1/31/90	31	-	1,521,000	0.049065	JAN
2/28/90	28	-	1,424,000	0.050857	FEB
3/31/90	31	-	1,619,000	0.052226	MAR
4/30/90	30	-	1,589,808	0.052994	APR
5/31/90	31	-	1,765,988	0.056967	MAY
6/30/90	30	-	2,144,645	0.071488	JUN
7/31/90	31	-	2,062,000	0.066516	JUL
8/31/90	31	-	9,380,695	0.302603	AUG
9/30/90	30	-	2,321,624	0.077387	SEP
10/31/90	31	-	2,179,657	0.070312	OCT
11/30/90	30	-	2,747,257	0.091575	NOV
12/31/90	31	-	2,598,441	0.083821	DEC
TOTALS:	365	-	31,354,115	0.085902	1990
MAX:		0.302603	MIN:	0.049065	

AREA: Fort Richardson

CONTACTS

1) William Garnand, Treatment Plant Operator, 863-7112
2) Jesse Wilson, Power Plant Manager, 864-1149

WATER SOURCES and BACKGROUND

A dam on Ship Creek diverts water to the treatment plants of Fort Richardson and Anchorage Water and Wastewater Utility. Each treatment plant is unique. The Fort Richardson treatment plant then supplies water to Fort Richardson laundry, and general base use. Elmendorf Air Force Base (EAFB) is also supplied by the Fort Richardson treatment plant. This includes delivery to a hospital, some base housing, and general EAFB use. No residential water-use (W-U) data was available. The Post Laundry delivery amount listed is included in the amount of water used on base but metered so that the laundromat can be billed.

In addition, Fort Richardson has three deep wells that supplement their surface water source. An Alaska Department of Fish and Game hatchery receives unchlorinated water from these three Fort Richardson wells when needed. The amount of well water listed on the Fort Richardson Treatment Plant Operating Log is an amount exclusive of the amount listed as delivered to the hatchery even though they come from the same source.

POWER and HEAT GENERATION

Fort Richardson uses three natural gas fired steam condensing turbines to produce electricity. One unit uses treated base water and does not consume any water. The remaining two use hatchery pond water but returns this water to the pond. When in service, each turbine uses about 3,000 gpm. They are routinely taken out of service for two weeks of the year for maintenance and longer if major repairs are needed. They are estimated to run 90 percent of the year. This would consume about 2,700 gpm.

Water consumed for cooling turbine bearings and machinery and domestic use is about 540,000 gpd.

The heating system uses three boilers. Treated water is used for make-up water. One boiler is down for the summer months, that is, about one-third of the year. January W-U was 124,500 gallons per day (gpd). Most water used during winter months. All things considered, an estimate of 75,000 gpd used for the heating system.

WITHDRAWALS

Surface Water	Gallons	MGD
Treatment Plant Base Use	806,561,000	2.21
Ground Water		
Base Use	71,896,800	0.20
Hatchery Use	139,197,000	0.38
Hatchery Use	402,984,000	1.10
Total GW	614,077,800	1.68
Total GW + SW	**1,420,638,800**	**3.89**

DELIVERIES

	Gallons	MGD
Into Treatment Plant	806,561,000	2.21
Backwash	-28,350,000	0.08
Out of Treatment Plant	778,211,000	2.13
GW Sources	614,077,800	1.68
Total Delivered	1,392,288,800	3.81

Residential - indeterminate

Commercial

Post Laundry	7,282,700	0.02
Heat Generation	27,375,000	0.08
Cooling System	197,100,000	0.54
Hatchery Well	139,197,000	0.38
Hatchery Well	402,984,000	1.10
Total:	773,938,700	2.12

Power Generation

	gpm	gpd	MGD
Non-consumptive:			
Steam Turbines	2700	3,888,000	3.89
Consumptive:			
Steam Turbines			**0.54**

CUSTOMERS SERVED

Base Population:	6,850	(from The Anchorage Daily News,
Base Families:	1,700	June 1, 1991, page A12)
Population per Family:	4.03	

Population Served

GW - A ratio of the amount of GW withdrawals to total withdrawals multiplied times the base population.

(1.69 / 3.89) X 6.85 = .43 X 6.85 = **2.96**

SW - A ratio of the amount of SW withdrawals to total withdrawals multiplied times the base population.

(2.21 / 3.89) X 6.85 = .57 X 6.85 = **3.89**

SEWAGE TREATMENT

Most sewage from Fort Richardson is delivered to the Anchorage Water and Wastewater Utility Point Woronzof sewage treatment plant. The limited amount of sewage treated on-base is through small septic systems and is unaccountable.

FACTS and CALCULATIONS

1) Because the amount of water delivered for domestic W-U is indeterminate, all withdrawals and deliveries will be considered commercial except for power generation.

COMPARISON of 1990 EUOWITUS to 1985

1) The comparison between the two years data will be made after all the Anchorage area W-U data is aggregated from Fort Richardson, EAFB, Anchorage Water and Wastewater Utility, and various smaller utilities in the area.

FT. RICHARDSON

ESTIMATED USE OF WATER IN THE UNITED STATES
1990 - DATA COLLECTION FORM - 1990

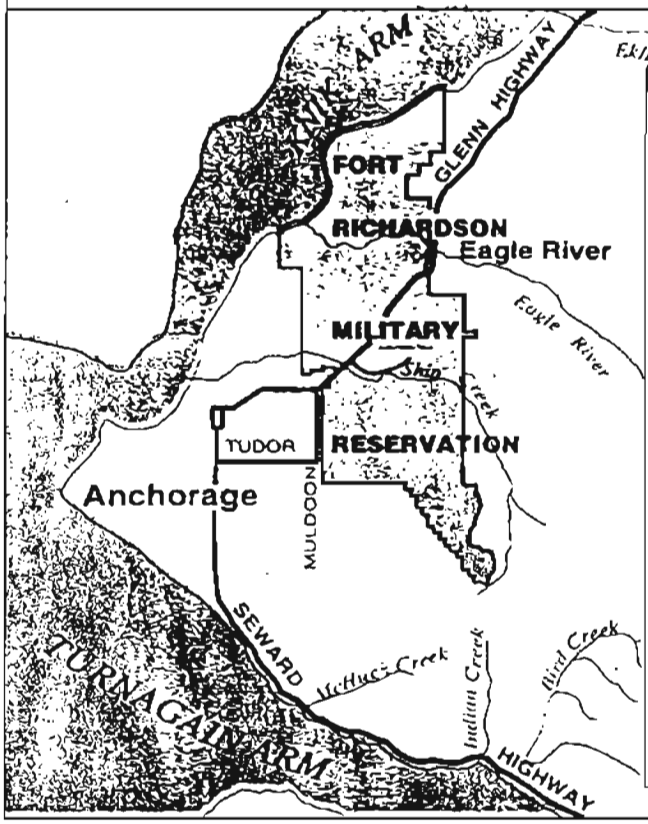
68/6/7

COUNTY or HUC NAME _____ COUNTY or HUC CODE _____ TOTAL POPULATION 6.85 (in thousands)

• UNITS IN MGD TO TWO DECIMAL PLACES (UNLESS OTHERWISE SPECIFIED)

	WATER SUPPLY	DOMESTIC	COMMERCIAL	INDUSTRIAL	MINING	FOSSIL FUEL	NUCLEAR	HYDROELECTRIC	LIVESTOCK	ANIMAL SPECIALTIES	IRRIGATION	SEWAGE TRMT.	RESERVOIR EVAP
Total Water Use													
GW Withdrawals - Fresh	1.68												
GW Withdrawals - Saline	—												
SW Withdrawals - Fresh	2.21												
SW Withdrawals - Saline	—												
GW - Population Served (thous.)	2.96												
SW - Population Served (thous.)	3.89												
Deliveries from Water Supply:			3.81			.54	0						
Consumptive Use - Fresh													
Consumptive Use - Saline													
Conveyance Loss													
Power Generation (GWh)													
Acres Irrigated - Sprayed (thous.)													
Acres Irrigated - Flooded (thous.)													
Number of Facilities	1					1	—						
# Facilities in WU Database	1					1	—						
WW total returns from municipal fac.													
# of Public WW Facilities													
# Industrial & Other WW Facilities													
Reclaimed Sewage													

FORT RICHARDSON FACTS



Size of base

Base size ..... 62,000 acres
Training acres ..... 47,000 acres

Uniformed Military 4,210
Civilian Employees.....1,600

On-base population 6,850

Uniformed Military 2,950
Dependents 3,900
Families on base 1,700

Off-base population 3,150

Uniformed Military 1,260
Dependents 1,890
Off base housing units occupied by military 1,200

Payroll

Military and civilian ..... $171 million
Other expenses ..... $62 million

Source: Municipality of Anchorage and Fort Richardson

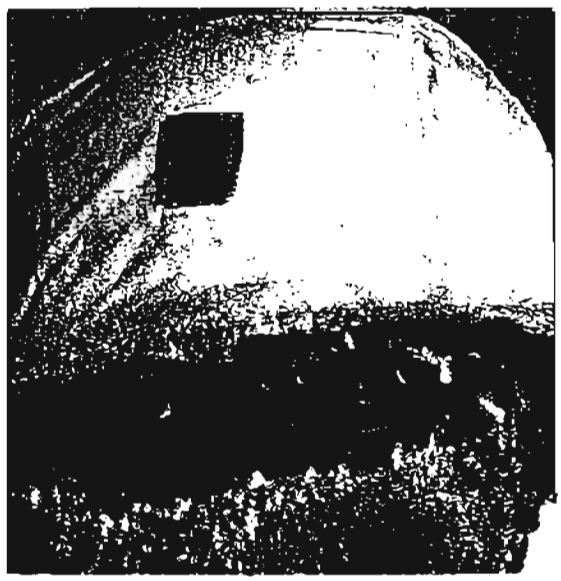
RON ENGSTROM / Anchorage Daily News

FORT RICHARDSON HISTORY

NAME: Named for military pioneer explorer Brig. Gen. Wilds Richardson, who served in the Alaska Territory 1897-1917.

BEGINNINGS: A bill authorizing construction of Fort Richardson and Elmendorf Air Force Base passed Congress in 1940. Military expansion to Alaska had been vigorously pushed for years by Alaska's territorial representative, Anthony Dimond, but it took Hitler's invasion of Norway, Denmark and the Netherlands in 1940 to effectively squelch the opposition.

T: 1940-41 on the site of what is now
lorf Air Force Base, and moved to its
location in 1950, when it had a
for 500 soldiers.



FT. RICHARDSON POWER & HEAT GENERATION

Plant Mgr., Jesse Wilson 864-1149

- 3 steam condensing turbines fired by natural gas
  1 uses treated base water and is not consumptive
  2 use water from hatchery pond and also is not consumptive.

  Each turbine uses ~3,000 gpm when in service. They are taken down for service for two weeks routinely during the year and down for months if a major overhaul is needed. Estimate they are used 90% of the year = 2700 gpm

- 3 boilers used for heating system. Make-up water is treated before use. One boiler down during summer, i.e. about 1/3 the year. January 1991 W-4 was 124,500 GPD for 3 boilers. Most water used during winter. All things considered, estimate 75,000 GPD for the heating system.

- Cooling water consumed to cool bearings and machinery and domestic use = 540,000 GPD

Water used for power generation 2700 gpm (non-consumptive), 540,000 GPD (consumptive). = (3.888 + .540) MGD = 4.428 MGD

+ .075 MGD

4.503

Well water from base to Hatchery =

1990 AKWUDS Monthly and Yearly Water Use Calculations Worksheet

Facility Name: U.S. DEPARTMENT OF THE ARMY, FT. RICHARDSON BASE USE

File Type and Number: ADL 45839 Sequence # : 01 W

DATE	DAYS	METER READING	GALLONS	MGD	MONTH
12/31/89	-	-	-	-	-
1/31/90	31	-	75,224,000	2.426581	JAN
2/28/90	28	-	62,497,000	2.232036	FEB
3/31/90	31	-	69,657,000	2.247000	MAR
4/30/90	30	-	76,423,000	2.547433	APR
5/31/90	31	-	78,498,000	2.532194	MAY
6/30/90	30	-	60,683,000	2.022767	JUN
7/31/90	31	-	74,258,000	2.395419	JUL
8/31/90	31	-	60,359,000	1.947065	AUG
9/30/90	30	-	56,632,000	1.887733	SEP
10/31/90	31	-	62,857,000	2.027645	OCT
11/30/90	30	-	66,382,000	2.212733	NOV
12/31/90	31	-	63,091,000	2.035194	DEC
TOTALS:	365	-	806,561,000	2.209756	1990

MAX: 2.547433 MIN: 1.887733

2.2098 base use
includes laundry

1990 AKWUDS Monthly and Yearly Water Use Calculations Worksheet

Facility Name: U.S. DEPT. OF THE ARMY FT. RICHARDSON W.T.P. BACKWASH

File Type and Number: ADL 45839 Sequence # : 01 D

DATE	DAYS	METER READING	GALLONS	MGD	MONTH
12/31/89	-	-	-		
1/31/90	31	-	2,190,000	0.070645	JAN
2/28/90	28	-	2,040,000	0.072857	FEB
3/31/90	31	-	2,400,000	0.077419	MAR
4/30/90	30	-	2,700,000	0.090000	APR
5/31/90	31	-	2,790,000	0.090000	MAY
6/30/90	30	-	2,460,000	0.082000	JUN
7/31/90	31	-	2,190,000	0.070645	JUL
8/31/90	31	-	2,250,000	0.072581	AUG
9/30/90	30	-	2,700,000	0.090000	SEP
10/31/90	31	-	2,250,000	0.072581	OCT
11/30/90	30	-	2,160,000	0.072000	NOV
12/31/90	31	-	2,220,000	0.071613	DEC
TOTALS:	365	-	28,350,000	0.077671	1990
MAX:		0.090000	MIN:	0.070645	

1990 AKWUDS Monthly and Yearly Water-Use Calculations Worksheet

Facility Name: U.S. DEPT. OF THE ARMY, FT. RICHARDSON POST LAUNDRY

File Type and Number: ADL 65557 Sequence # : 06 T

DATE	DAYS	METER READING	GALLONS	MGD	MONTH
12/31/89	-	-	-	-	-
1/31/90	31	-	483,200	0.015587	JAN
2/28/90	28	-	402,600	0.014379	FEB
3/31/90	31	-	585,800	0.018897	MAR
4/30/90	30	-	797,900	0.026597	APR
5/31/90	31	-	801,200	0.025845	MAY
6/30/90	30	-	759,500	0.025317	JUN
7/31/90	31	-	676,100	0.021810	JUL
8/31/90	31	-	613,500	0.019790	AUG
9/30/90	30	-	677,600	0.022587	SEP
10/31/90	31	-	509,200	0.016426	OCT
11/30/90	30	-	475,500	0.015850	NOV
12/31/90	31	-	500,600	0.016148	DEC
TOTALS:	365	-	7,282,700	0.019953	1990
MAX:		0.026597	MIN:	0.014379	

METERED SEPARATELY FOR BILLING PURPOSES.
THIS AMOUNT IS PART OF TREATMENT PLANT TOTAL.

1990 AKWUDS Monthly and Yearly Water-Use Calculations Worksheet

Facility Name: U.S. DEPT. OF THE ARMY FT. RICHARDSON 3 DEEP WELLS

File Type and Number: ADL 45839 Sequence # : 01 W

DATE	DAYS	METER READING	GALLONS	MGD	MONTH
12/31/89	-	-	-	-	-
1/31/90	0	-	0	0.000000	JAN
2/28/90	0	-	0	0.000000	FEB
3/31/90	31	-	5,235,800	0.168897	MAR
4/30/90	30	-	21,797,000	0.726567	APR
5/31/90	31	-	26,132,000	0.842968	MAY
6/30/90	30	-	13,198,000	0.439933	JUN
7/31/90	31	-	2,152,000	0.069419	JUL
8/31/90	31	-	200,000	0.006452	AUG
9/30/90	30	-	1,002,000	0.033400	SEP
10/31/90	0	-	0	0.000000	OCT
11/30/90	30	-	854,000	0.028467	NOV
12/31/90	31	-	1,326,000	0.042774	DEC
TOTALS:	275	-	71,896,800	0.261443	
	365			0.196978	1990
	MAX:	0.842968	MIN:	0.000000	

PWS COMM.

1990 AKWUDS Monthly and Yearly Water-Use Calculations Worksheet

Facility Name: U.S. DEPT. OF THE ARMY, FT. RICHARDSON HATCHERY WELL #3

File Type and Number: ADL 65557 Sequence # : 05 T

DATE	DAYS	METER READING	GALLONS	MGD	MONTH
12/31/89	-	-	-	-	-
1/31/90	0	-	0	0.000000	JAN
2/28/90	0	-	0	0.000000	FEB
3/31/90	31	-	37,622,000	1.213613	MAR
4/30/90	30	-	48,268,000	1.608933	APR
5/31/90	31	-	45,550,000	1.469355	MAY
6/30/90	30	-	7,757,000	0.258567	JUN
7/31/90	0	-	0	0.000000	JUL
8/31/90	0	-	0	0.000000	AUG
9/30/90	0	-	0	0.000000	SEP
10/31/90	0	-	0	0.000000	OCT
11/30/90	0	-	0	0.000000	NOV
12/31/90	0	-	0	0.000000	DEC
TOTALS:	122	-	139,197,000	1.140353	
	365			.381362	1990
MAX:		1.608933	MIN:	0.000000	

TW
SW COMM

1990 AKUUDS Monthly and Yearly Water-Use Calculations Worksheet

Facility Name: AK. DEPT. OF FISH & GAME FT. RICH HATCERY

File Type and Number: LAS 12263 Sequence # : 01 W

DATE	DAYS	GPM	GALLONS	MGD	MONTH
12/31/89	-	-	-	-	-
1/31/90	31	750.0	33,480,000	1.080000	JAN
2/28/90	28	750.0	30,240,000	1.080000	FEB
3/31/90	31	750.0	33,480,000	1.080000	MAR
4/30/90	30	750.0	32,400,000	1.080000	APR
5/31/90	31	750.0	33,480,000	1.080000	MAY
6/30/90	30	800.0	34,560,000	1.152000	JUN
7/31/90	31	800.0	35,712,000	1.152000	JUL
8/31/90	31	800.0	35,712,000	1.152000	AUG
9/30/90	30	800.0	34,560,000	1.152000	SEP
10/31/90	31	750.0	33,480,000	1.080000	OCT
11/30/90	30	750.0	32,400,000	1.080000	NOV
12/31/90	31	750.0	33,480,000	1.080000	DEC
TOTALS:	365	9,200	402,984,000	1.104066	
	AVG GPM	637.6			1990
	MAX:	1.152000	MIN:	1.080000	

GW COMM.

UTILITY: College Utilities Corporation (CUC)

CONTACTS: George E. Gordon, President/Manager 479-3118

WATER SOURCE: Well Water

W-U TOTALS:		
	Residential Sales	155,092,293
	Commercial Sales	41,462,192
	Miscellaneous Sales	1,397,641
	Industrial Sales	0
	Total	**197,787,325**

CUSTOMER INFORMATION

Residential Customers	Commercial Customers	Miscellaneous Customers	Industrial Customers
1,531	105	5	0

FACTS and CALCULATIONS

1) CUC district is exclusive of Fairbanks Municipal Utility System (FMUS). The district generally lies west of Fairbanks city limits.
2) Total water withdrawn: 293,350,700 gallons
   Backwash water used: -49,000,000 gallons
   Total water treated: 244,350,700 gallons
3) Fresh GW withdrawals per day:
   293.3507 MGD / 365 days = **.80 MGD.**
4) Number of residential dwelling units served by CUC = 2926.
5) Estimated population served = 9500 people.
6) People/household from CUC statistics = 9500/2926 = 3.25
7) Average domestic use per day:
   155,092,293 gallons / 365 days = 424,910 gallons per day = **.42 MGD.**
8) Average W-U per household:
   424,910 gallons per day / 2926 dwelling units = 145 gallons per day per household.
9) Average W-U per person:
   155,092,293 gallons per year / 365 days per year / 9500 people = 45 gallons per person per day.
10) Average estimated per capita use:
   .80 MGD / 9500 capita = 85 gallons per capita per day
11) Miscellaneous sales were considered to be commercially related water-uses. Therefore, total commercial W-U:
   41,462,192 gallons + 1,397,641 gallons = 42,859,833 gallons.
12) Average daily commercial W-U = 42.860 MG / 365 days = .12 MGD.
13) CUC claims no industrial W-U. Examination of the Standard Industrial Classification codes for industrial W-U indicates that industrial W-U does actually occur in College. An estimate of one-tenth of total commercial W-U was used to estimate industrial W-U. Therefore, the actual metered commercial W-U was split 1:10 as the ratio of industrial to commercial W-U:
   .12 MGD metered commercial X .10 = .01 MGD estimated industrial W-U.

Estimated commercial W-U was then:
.12 MGD - .01 MGD = .11 MGD.

14) The sewage treatment plant discharged 330,904,900 gallons of effluent to the FMUS sewage treatment facility during 1990. Average daily return:
330.9049 MG / 365 days = .91 MGD.

WATER SUPPLY:

1) All entries in this category were obtained from CUC or calculated from their reported data.

COMPARISON OF 1985 TO 1990 SUMMARIES

1) No data was available from the 1985 EUOWITUS for comparison to the 1990 EUOWITUS. Comments on results follow.

COMMENTS on RESULTS

1) Total Population - College, Alaska does not appear independently on neither the state nor federal census. It is counted with other communities which comprise the entire Fairbanks North Star Borough.
2) GW Population Served - This figure came directly from CUC and may be related to population figures of the town of College with some effort.
3) GW Withdrawals-Fresh - This figure came directly from CUC.
4) Domestic - The computed delivery figure of 45 gallons per person per day for this utility is in the low range of W-U but still plausible. College has a significant student population and the domestic W-U may reflect conservative practices.
5) Commercial - Miscellaneous sales more than likely include sales to water wagons which is a common practice in the area. It is quite logical that miscellaneous sales should be dominantly commercial uses.
6) Industrial - From my personal visits to the area, I cannot recall much industrial activity. Ten percent is arbitrary and may or may not be close.
7) Fossil Fuel - No W-U for fossil fuel power generation in College. Electricity is obtained from the inter-tie system with Healy and Anchorage.
8) Nuclear - No W-U for nuclear power generation in College.
9) Sewage Treatment - There is no treatment plant in College. All effluent is piped to the FMUS wastewater treatment plant. The effluent figure being greater than the withdrawal figure is attributable to storm drain systems which add water to the wastewater system.

COLLEGE UTILITIES CORP.

ESTIMATED USE OF WATER IN THE UNITED STATES
1990 - DATA COLLECTION FORM - 1990

8/6/2 2/9/89

COUNTY or HUC NAME _____ COUNTY or HUC CODE _____ TOTAL POPULATION (in thousands) FED 77.720 STATE 74,031 FBX.N.S

* UNITS IN MGD TO TWO DECIMAL PLACES (UNLESS OTHERWISE SPECIFIED)

	WATER SUPPLY	DOMESTIC	COMMERCIAL	INDUSTRIAL	MINING	FOSSIL FUEL	NUCLEAR	HYDROELECTRIC	LIVESTOCK	ANIMAL SPECIALTIES	IRRIGATION	SEWAGE TRMT.	RESERVOIR EVAP
Total Water Use													
GW Withdrawals - Fresh	.80												
GW Withdrawals - Saline	0												
SW Withdrawals - Fresh	0												
SW Withdrawals - Saline	0												
GW - Population Served (thous.)	9.5												
SW - Population Served (thous.)	0												
Deliveries from Water Supply:		.42	.11	.01		0	0						
Consumptive Use - Fresh													
Consumptive Use - Saline													
Conveyance Loss													
Power Generation (GWh)													
Acres Irrigated - Sprayed (thous.)													
Acres Irrigated - Flooded (thous.)													
Number of Facilities													
# Facilities in WU Database												0	
WW total returns from municipal fac.												.91	
# of Public WW Facilities												0	
# Industrial & Other WW Facilities													
Reclaimed Sewage													

TO: See Distribution
CC:
From: Robert R. Pierce, Hydrologist, Doraville, GA (RRPIERCE)
Date: Thursday, April 04, 1991 08:21:28
Subject: EUOWITUS DOCUMENTATION FORM

E U O W I T U S 1 9 9 0 ***** D O C U M E N T A T I O N

COMPLETE LIST OF SOURCES - (report ALL data received (incl.coefficients) that were used to complete the information for 1990 EUOWITUS)

** 1 **

CATEGORIES OF USE (IN,DO,IR etc): PWS, DO, CO, IN, ST

TYPE (pumpage,acres,coefficient): Pumpage

AGENCY College Utilities Corp.

CONTACT PERSON George E. Gordon, 479-3118

YEAR OF DATA 1990

ACCURACY Poor

AERIAL EXTENT (site-specific, county, HUC, etc) College AK., West of Fairbanks city limits

FORMAT (printout, publication, verbal communication, etc) Verbal communication and documentation data sheet.

** 2 **

CATEGORIES OF USE (IN,DO,IR etc):

TYPE (pumpage,acres,coefficient):

AGENCY

CONTACT PERSON

YEAR OF DATA

ACCURACY

AERIAL EXTENT (site-specific, county, HUC, etc)

FORMAT (printout, publication, verbal communication

REPORTED EUOWITUS INFORMATION
- (From the listed sources above please explain how the 'reported' figures for COUNTY, HUC & AQUIFER were derived? In each case referal to any data (incl. coefficients) must come from the "COMPLETE LIST OF SOURCES".

-- WATER SUPPLY --	
WITHDRAWALS	.80
POPULATION SERVED	9.5
NUMBER OF FACILITIES	1

-- COMMERCIAL --	
WITHDRAWALS	.16
DELIVERIES	.11
CONSUMPTIVE USE	.05

-- DOMESTIC --	
WITHDRAWALS	.62
DELIVERIES	.42
CONSUMPTIVE USE	.20

-- INDUSTRIAL --	
WITHDRAWALS	.01
DELIVERIES	.01
CONSUMPTIVE USE	
NUMBER OF FACILITIES	
RECLAIMED WASTEWATER	
-- THERMOELECTRIC --	
WITHDRAWALS	
DELIVERIES	
CONSUMPTIVE USE	
NUMBER OF FACILITES	
-- MINING --	
WITHDRAWALS	
CONSUMPTIVE USE	
-- HYDROELECTRIC --	
TOTAL WATER USE	
POWER GENERATION	
NUMBER OF FACILITIES	
-- LIVESTOCK --	
WITHDRAWALS	
DELIVERIES	
CONSUMPTIVE USE	
-- IRRIGATION --	
WITHDRAWALS AMOUNTS	
CONSUMPTIVE USE	
CONVEYANCE LOSSES	
ACRES IRRIGATED (spray & flood)	
RECLAIMED WASTEWATER	
-- SEWAGE TREATMENT --	
NUMBER OF FACILITES	0
TOTAL WASTE WATER RETURNS	.91
NUMBER OF PUBLIC WASTE WATER FACILITIES	0
NUMBER INDUSTRIAL & OTHER WASTE WATER FACILITIES	
AMOUNT OF WATER RETURNED TO BENEFICIAL USE	
-- RESERVOIR EVAPORATION --	
CONSUMPTIVE USE	
SURFACE AREA	

TO: Distribution list.

Wayne B. Solley, Chief, BWUI, Reston, VA (WBSOLLEY)
David W. Litke, Hydrologist, Lakewood, CO (DWLITKE)
Nancy L. Barber, Hydrologist(Geologist), Jackson, MS (NLBARBER)
Leslie D. Patrick, Hyd (SA), Anchorage, AK (LDPATRICK)

SMIP: Recipient(s) list.

COLLEGE UTILITIES CORP.
P.O. BOX 80370
COLLEGE STATION
FAIRBANKS, ALASKA 99708
(907) 479-3118 OR
24 HR ANS SVC (907) 479-2760

Speed Message

☐ IMMEDIATE REPLY REQUESTED

☒ NO REPLY NECESSARY

7a

Mr. Bill Petrik
State of Alaska
Department of Natural Resources
P.O. Box 772116
Eagle River, Alaska 99677-2116

TO USE WINDOW ENVELOPE FOR RETURNING MESSAGE TO SENDER
FOLD HERE
◄◄◄ SUBJECT ►►►

DATE

March 7, 1991

Message

~~Per your request letter dated March 4, 1991.~~

George E. Gordon
~~President/Manager~~

~~COLLEGE UTILITIES CORP.~~

~~GEG/ph~~

SIGNED

Reply

DATE

SIGNED

PLEASE RETURN THIS COPY TO SENDER

COLLEGE UTILITIES

U.S.G.S. QUESTIONNAIRE FOR 1990

(For CUC Fiscal Year December 1989 - November 1990)

1. Fairbanks Alaska (Area generally west of city limits).

2. Total withdrawn.....244,350,700 Treated
   Plus.....49,000,000 Backwash

3. Well Water

4. Residential Sales.....155,092,293
   Commercial Sales.....41,462,192
   Miscellaneous Sales..... 1,397,641
   Industrial Sales..... -0-
   197,787,325

5. Residential Customers (Avg).....1531
   Commercial Customers (Avg)..... 100
   Miscellaneous Customers (Avg)..... 5
   (Residential represents 2926 dwelling units)

6. Estimated Population..... 9500

7. Sewage Discharged.....330,904,900
   No plants maintained, sewage is discharged to area wide plant owned by City of Fairbanks.

8. No power generation.

UTILITY: Fairbanks Municipal Utility System (FMUS)

CONTACTS:

1) Jon Paul Stenberg, FMUS, 459-6259
2) Virgil Holman, Foreman, FMUS, 459-6278

WATER SOURCES:

1) FMUS wells 1, 2, 3, and firewell 3.
2) Total amount withdrawn = 1,178,988,600 gallons / 365 days per year = 3.23 MGD.
3) Amount available for distribution = 1,101,299,100 gallons / 365 days per year = 3.02 MGD.

CUSTOMER AND DELIVERY INFORMATION

	Customers Served	Gallons Delivered	MGD
Residential	3,467	216,280,369	**0.59**
Commercial	2,550	644,539,662	**1.77**
Fossil Fuel Generation	1	43,556,493	**0.12**

FACTS and CALCULATIONS

1) All "**WATER SOURCES**" and "**CUSTOMER INFORMATION**" data obtained from FMUS, Table of Utility Statistics, December 1990.
2) Domestic W-U totals from FMUS. 216,280,369 gallons / 365 days = **.59 MGD**
3) Fossil fuel generation W-U estimated from the FMUS interdepartmental category. Jon Paul Stenberg estimated that 95 percent of interdepartmental W-U was for the local electric utility coal fired steam turbines. 45,848,940 gallons X .95 = 43,556,493 gallons / 365 days per year = **.12 MGD** The remainder of the interdepartmental W-U was contributed to the commercial W-U category. 45,848,940 gallons - 43,556,493 gallons = 2,292,447 gallons
4) Commercial W-U from the FMUS 1990 summary table indicated 642,247,215 gallons. Add to this the amount from the interdepartmental category determined to be commercial W-U and the total is 642,247,215 gallons + 2,292,447 gallons = 644,539,662 gallons. Even though the FMUS says there is no industrial W-U in the city of Fairbanks, an estimate of 10 percent of total commercial W-U was used for industrial W-U.
   644,539,662 X .10 = 64,453,966 gallons / 365 days = **.18 MGD**
   Commercial W-U then =:
   644,539,662 gallons X .90 = 580,085,696 gallons / 365 days = **1.59 MGD**
5) Total water delivered = 216,280,369 gallons residential W-U
   580,085,696 gallons commercial W-U
   + 64,453,966 gallons industrial W-U
   860,820,031 gallons total W-U
6) The percent of withdrawn water delivered is:
   860,820,031 gallons / 1,178,988,600 gallons = **73.0 percent**
7) The percent of water delivered of water available for distribution:
   860,820,031 gallons / 1,101,299,100 gallons = **78.2 percent**
8) One sewage treatment plant is operated by the FMUS. In addition to FMUS withdrawn water, it also processes storm drain water and effluent from College Utilities Corporation.

This accounts for an amount of effluent greater than withdrawals. The amount of water returned to the Tanana River = 2,073.0 MG / 365 days = **5.68 MGD**.

9) Mark Grundestad, of the Fairbanks North Star Borough (FNSB) demographics section, 452-4761 ext. 212, says there is an average of 2.74 people per residence in the entire FNSB. The population served is:

2.74 people per residence X 3,467 residential customers = **9,500 people.**

10) Per capita use:

3.23 MGD / 9,500 capita = **340 gallons per capita per day**

Domestic per capita use:

0.59 MGD / 9,500 people = 62 gallons per capita per day.

11) The federal census for the city of Fairbanks = 30,843 which includes military personnel that reside off-base from both Fort Wainwright and Eielson Air Force Base. The state census for the city of Fairbanks is 28,853 which includes 7,860 people from Fort Wainwright but not the 5,314 residents of Eielson Air Force Base. Eielson and Wainwright figures supplied by Mike Vigue from Alaska Department of Community and Regional Affair, Juneau, 465-4500.

12) No W-U for nuclear power generation in FNSB for 1990.

WATER SUPPLY:

1) The groundwater withdrawal data was taken from the December 1990 FMUS "Table of Utility Statistics". The groundwater population served was calculated as outlined in 9 of the **"FACTS and CALCULATIONS"** section, above.

COMPARISON OF 1985 TO 1990 SUMMARIES

1) The 1985 USGS EUOWITUS was performed for the entire FNSB. The 1990 summary performed by DGGS includes only the city of Fairbanks and College Utilities Corporation. Consequently, no comparisons of the 1990 DGGS EUOWITUS will be made to the 1985 USGS EUOWITUS.

OTHER DATA SOURCES

1) The FNSB includes the communities and utilities of:
   a) College Utilities Corporation
   b) Eielson Air Force Base utility - 377-1110
   c) Fort Wainwright utility - 353-7207
   d) Lakeview Trailer Court
   e) City of North Pole - Philip R. Ensley, 488-6111
   f) University of Alaska at Fairbanks
   g) various other public suppliers in the FNSB area
2) College Utilities Corporation W-U data was processed as part of the 1990 DGGS EUOWITUS.

FAIRBANKS MUNICIPAL UTILITY SYSTEM

ESTIMATED USE OF WATER IN THE UNITED STATES
1990 – DATA COLLECTION FORM – 1990

68/6/2

COUNTY or HUC NAME _____ COUNTY or HUC CODE _____ TOTAL POPULATION _____ (in thousands)

* UNITS IN MGD TO TWO DECIMAL PLACES (UNLESS OTHERWISE SPECIFIED)

	WATER SUPPLY	DOMESTIC	COMMERCIAL	INDUSTRIAL	MINING	FOSSIL FUEL	NUCLEAR	HYDROELECTRIC	LIVESTOCK	ANIMAL SPECIALTIES	IRRIGATION	SEWAGE TRMT.	RESERVOIR EVAP
Total Water Use													
GW Withdrawals – Fresh	3.23												
GW Withdrawals – Saline	–												
SW Withdrawals – Fresh	–												
SW Withdrawals – Saline	–												
GW – Population Served (thous.)	950												
SW – Population Served (thous.)	–												
Deliveries from Water Supply:		.59	1.59	.18		.12	–						
Consumptive Use – Fresh													
Consumptive Use – Saline													
Conveyance Loss													
Power Generation (GWh)													
Acres Irrigated – Sprayed (thous.)													
Acres Irrigated – Flooded (thous.)													
Number of Facilities	1												
# Facilities in WU Database	1											1	
WW total returns from municipal fac.												5.68	
# of Public WW Facilities												1	
# Industrial & Other WW Facilities													
Reclaimed Sewage													

TO: See Distribution
CC:
From: Robert R. Pierce, Hydrologist, Doraville, GA (RRPIERCE)
Date: Thursday, April 04, 1991 08:21:28
Subject: EUOWITUS DOCUMENTATION FORM

E U O W I T U S 1 9 9 0 ***** D O C U M E N T A T I O N

COMPLETE LIST OF SOURCES - (report ALL data received (incl.coefficients) that were used to complete the information for 1990 EUOWITUS)

** 1 **

CATEGORIES OF USE (IN,DO,IR etc): PWS, DO, CO, IN, ST, FP

TYPE (pumpage,acres,coefficient): PUMPAGE

AGENCY Fairbanks Municipal Utility System (FMUS)

CONTACT PERSON Jon Paul Stenberg, 459-6259

YEAR OF DATA 1990

ACCURACY Poor

AERIAL EXTENT (site-specific, county, HDC, etc) Municipal Limits

FORMAT (printout, publication, verbal communication, etc) Verbal communications, FMUS Summary 1990 Data

---

** 2 **

CATEGORIES OF USE (IN,DO,IR etc):

TYPE (pumpage,acres,coefficient):

AGENCY

CONTACT PERSON

YEAR OF DATA

ACCURACY

AERIAL EXTENT (site-specific, county, HDC, etc)

FORMAT (printout, publication, verbal communication

REPORTED EUOWITUS INFORMATION
- (from the listed sources above please explain how the 'reported' figures for COUNTY, HDC & AQUIFER were derived? In each case referal to any data (incl. coefficients) must come from the "COMPLETE LIST OF SOURCES".

-- WATER SUPPLY --	
WITHDRAWALS	3.23
POPULATION SERVED	9.50
NUMBER OF FACILITIES	1
-- COMMERCIAL --	
WITHDRAWALS	2.07
DELIVERIES	1.59
CONSUMPTIVE USE	.48
-- DOMESTIC --	
WITHDRAWALS	.77
DELIVERIES	.59
CONSUMPTIVE USE	.18

-- INDUSTRIAL --	
WITHDRAWALS	.23
DELIVERIES	.18
CONSUMPTIVE USE	.05
NUMBER OF FACILITIES	
RECLAIMED WASTEWATER	

-- THERMOELECTRIC --	
WITHDRAWALS	.16
DELIVERIES	.12
CONSUMPTIVE USE	.04
NUMBER OF FACILITES	1

-- MINING --	
WITHDRAWALS	
CONSUMPTIVE USE	

-- HYDROELECTRIC --	
TOTAL WATER USE	
POWER GENERATION	
NUMBER OF FACILITIES	

-- LIVESTOCK --	
WITHDRAWALS	
DELIVERIES	
CONSUMPTIVE USE	

-- IRRIGATION --	
WITHDRAWALS AMOUNTS	
CONSUMPTIVE USE	
CONVEYANCE LOSSES	
ACRES IRRIGATED (spray & flood)	
RECLAIMED WASTEWATER	

-- SEWAGE TREATMENT --	
NUMBER OF FACILITES	1
TOTAL WASTE WATER RETURNS	5.68
NUMBER OF PUBLIC WASTE WATER FACILITIES	1
NUMBER INDUSTRIAL & OTHER WASTE WATER FACILITIES	
AMOUNT OF WATER RETURNED TO BENEFICIAL USE	

-- RESERVOIR EVAPORATION --	
CONSUMPTIVE USE	
SURFACE AREA	

TO: Distribution list.

Wayne B. Solley, Chief, BWU!, Reston, VA (WBSOLLEY)
David W. Litke, Hydrologist, Lakewood, CO (DWLITKE)
Nancy L. Barber, Hydrologist(Geologist), Jackson, MS (NLBARBER)
Leslie D. Patrick, Hyd (SA), Anchorage, AK (LDPATRICK

SMTP: Recipient(s) list.

1990 AKWUDS Monthly and Yearly Water-Use Calculations Worksheet

Facility Name: FAIRBANKS, CITY OF WELL #1A

File Type and Number: ADL 53813 Sequence # : 01 W

DATE	DAYS	METER READING	GALLONS	MGD	MONTH
12/31/89	-	-	-	-	-
1/31/90	31	-	98,076,000	3.163742	JAN
2/28/90	28	-	88,440,000	3.158571	FEB
3/31/90	31	-	98,208,000	3.168000	MAR
4/30/90	30	-	95,040,000	3.168000	APR
5/31/90	31	-	97,944,000	3.159484	MAY
6/30/90	30	-	93,588,000	3.119600	JUN
7/31/90	31	-	97,812,000	3.155226	JUL
8/31/90	31	-	98,208,000	3.168000	AUG
9/30/90	30	-	95,040,000	3.168000	SEP
10/31/90	31	-	98,340,000	3.172258	OCT
11/30/90	30	-	95,040,000	3.168000	NOV
12/31/90	31	-	84,348,000	2.720903	DEC
TOTALS:	365	-	1,140,084,000	3.123518	1990

MAX: 3.172258 MIN: 2.720903

1990 AKWUDS Monthly and Yearly Water-Use Calculations Worksheet

Facility Name: FAIRBANKS, CITY OF WELL #2A

File Type and Number: ADL 53813 Sequence # : 02 W

DATE	DAYS	METER READING	GALLONS	MGD	MONTH
12/31/89	-	-	-	-	-
1/31/90	31	-	162,000	0.005226	JAN
2/28/90	0	-	0	0.000000	FEB
3/31/90	0	-	0	0.000000	MAR
4/30/90	0	-	0	0.000000	APR
5/31/90	0	-	0	0.000000	MAY
6/30/90	0	-	0	0.000000	JUN
7/31/90	0	-	0	0.000000	JUL
8/31/90	0	-	0	0.000000	AUG
9/30/90	0	-	0	0.000000	SEP
10/31/90	0	-	0	0.000000	OCT
11/30/90	30	-	48,600	0.001620	NOV
12/31/90	0	-	0	0.000000	DEC
TOTALS:	61	-	210,600	0.003452	1990
MAX:		0.005226	MIN:	0.000000	

1990 AKWUDS Monthly and Yearly Water-Use Calculations Worksheet

Facility Name: FAIRBANKS, CITY OF WELL #3A

File Type and Number: ADL 53813 Sequence # : 03 W

DATE	DAYS	METER READING	GALLONS	MGD	MONTH
12/31/89	-	-	-	-	-
1/31/90	31	-	102,000	0.003290	JAN
2/28/90	28	-	204,000	0.007286	FEB
3/31/90	0	-	0	0.000000	MAR
4/30/90	0	-	0	0.000000	APR
5/31/90	31	-	50,388,000	1.625419	MAY
6/30/90	30	-	72,318,000	2.410600	JUN
7/31/90	31	-	56,916,000	1.836000	JUL
8/31/90	31	-	75,276,000	2.428258	AUG
9/30/90	30	-	15,708,000	0.523600	SEP
10/31/90	0	-	0	0.000000	OCT
11/30/90	30	-	10,200	0.000340	NOV
12/31/90	31	-	3,468,000	0.111871	DEC
TOTALS:	273	-	274,390,200	1.005092	
					1990
MAX:		2.426258	MIN:	0.000000	

1990 AKWUDS Monthly and Yearly Water-Use Calculations Worksheet

Facility Name: FAIRBANKS, CITY OF FIREWELL #3

File Type and Number: LAS 239 Sequence # : 01 W

DATE	DAYS	METER READING	GALLONS	MGD	MONTH
12/31/89	-	-	-	-	-
1/31/90	0	-	0	0.000000	JAN
2/28/90	0	-	0	0.000000	FEB
3/31/90	0	-	0	0.000000	MAR
4/30/90	0	-	0	0.000000	APR
5/31/90	0	-	0	0.000000	MAY
6/30/90	0	-	0	0.000000	JUN
7/31/90	0	-	0	0.000000	JUL
8/31/90	0	-	0	0.000000	AUG
9/30/90	0	-	0	0.000000	SEP
10/31/90	0	-	0	0.000000	OCT
11/30/90	30	-	36,000	0.001200	NOV
12/31/90	31	-	14,535,000	0.468871	DEC
TOTALS:	61	-	14,571,000	0.238869	1990
	MAX:	0.468871	MIN:	0.000000	

1990 AKWUDS Monthly and Yearly Water-Use Calculations Worksheet

Facility Name: FAIRBANKS, CITY OF DISTRIBUTION

File Type and Number: ADL 53813 Sequence # : 01 T

DATE	DAYS	METER READING	GALLONS	MGD	MONTH
12/31/89	-	-	-	-	-
1/31/90	31	-	103,023,000	3.323323	JAN
2/28/90	28	-	89,557,000	3.198464	FEB
3/31/90	31	-	87,069,300	2.808687	MAR
4/30/90	30	-	83,167,000	2.772233	APR
5/31/90	31	-	101,135,700	3.262442	MAY
6/30/90	30	-	109,019,000	3.633967	JUN
7/31/90	31	-	114,836,100	3.704390	JUL
8/31/90	31	-	100,233,400	3.235271	AUG
9/30/90	30	-	77,730,500	2.591017	SEP
10/31/90	31	-	72,164,000	2.327871	OCT
11/30/90	30	-	80,129,300	2.670977	NOV
12/31/90	31	-	81,337,000	2.623774	DEC
TOTALS:	365	-	1,093,461,300	3.012223	1990
MAX:		3.704390	MIN:	2.327871	

1990 AKWUDS Monthly and Yearly Water-Use Calculations Worksheet

Facility Name: FAIRBANKS, CITY OF WATER TREATMENT PLANT

File Type and Number: ADL 53813 Sequence # : 01 D

DATE	DAYS	METER READING	GALLONS	MGD	MONTH
12/31/89	-	-	-	-	-
1/31/90	31	-	107,816,000	3.477935	JAN
2/28/90	28	-	93,890,000	3.353214	FEB
3/31/90	31	-	92,417,400	2.981206	MAR
4/30/90	30	-	89,472,100	2.982403	APR
5/31/90	31	-	107,373,600	3.463665	MAY
6/30/90	30	-	113,663,500	3.788783	JUN
7/31/90	31	-	121,169,600	3.908697	JUL
8/31/90	31	-	106,357,800	3.430897	AUG
9/30/90	30	-	88,112,200	2.937073	SEP
10/31/90	31	-	84,568,500	2.728016	OCT
11/30/90	30	-	84,252,300	2.808410	NOV
12/31/90	31	-	87,348,000	2.817677	DEC
TOTALS:	365	-	1,176,441,000	3.223126	1990
MAX:		3.908697	MIN:	2.728016	

1990 AKWUDS Monthly and Yearly Water-Use Calculations Worksheet

Facility Name: FAIRBANKS, CITY OF WASTEWATER TREAT. PLANT

File Type and Number: LAS 225 Sequence # : 01 R

DATE	DAYS	METER READING	GALLONS	MGD	MONTH
12/31/89	-	-	-	-	-
1/31/90	31	-	162,100,000	5.229032	JAN
2/28/90	28	-	152,400,000	5.442857	FEB
3/31/90	31	-	165,700,000	5.345161	MAR
4/30/90	30	-	173,400,000	5.780000	APR
5/31/90	31	-	171,000,000	5.516129	MAY
6/30/90	30	-	169,800,000	5.660000	JUN
7/31/90	31	-	187,300,000	6.041935	JUL
8/31/90	31	-	197,500,000	6.370968	AUG
9/30/90	30	-	179,100,000	5.970000	SEP
10/31/90	31	-	178,300,000	5.751613	OCT
11/30/90	30	-	166,400,000	5.546667	NOV
12/31/90	31	-	170,000,000	5.483871	DEC
TOTALS:	365	-	2,073,000,000	5.679452	1990
MAX:		6.370968	MIN:	5.229032	

Post-it™ brand fax transmittal memo 7671 | # of pages ▸ 1

To BILL PETRIK	From JON PAUL STENBERG
Co USGS	Co FMUS
Dept	Phone # 459-6259
Fax # 6916-0078	Fax # 459-6257

F.1

FAIRBANKS MUNICIPAL UTILITIES SYSTEM
WATER UTILITY
Table of Utility Statistics
December 1990

	CURRENT MONTH 1990	CURRENT MONTH 1989	YEAR TO DATE 1990	MGD	YEAR TO DATE 1989
Generation					
Gross Production	87,378,000	99,936,000	1,178,988,600	3.23	1,171,766,160
less station use	6,041,000	5,281,000	77,667,000		66,295,260
less water to water projects	0	0	22,500		0
Total Available for Distribution	81,337,000	94,655,000	~~1,101,344,100~~ 1,101,299,100	3.02	1,105,470,900

	# OF CUSTOMERS 1990	# OF CUSTOMERS 1989	CURRENT MONTH 1990	CURRENT MONTH 1989	YEAR TO DATE 1990	YEAR TO DATE 1989
Distribution						
Residential	3,467	3,439	15,471,887	15,631,952	216,280,369 .59	221,511,801
Commercial	2,543	2,588	43,471,952	51,669,770	642,247,215 +2,292,447=644,539,662	631,843,080
Interdepartmental	8	12	1,850,811	4,023,775	45,848,940 X.95=43,556,493 +2,292,447	22,479,306
	6,018	6,039	60,794,650	71,325,497	904,376,524	875,834,187
Reported Distribution Loss			45,000	2,208,160	7,661,800	6,792,900
Reported Fire Department Usage			0	n/a	647,500	994,000
Unbilled or Unaccounted			20,497,350	71,121,343	188,656,276	221,849,813
Total Distribution			81,337,000	94,655,000	1,101,344,100	1,105,470,900

Peaking						
Treatment (per day)	6th	7th	3,818,100	3,958,000	3,934,767	3,759,337
Distribution (per day)	14th	9th	2,892,000	3,717,000	3,568,550	3,384,083
2 Hour Demand (peak 2 hrs I 12)	15th	n/a	4,520,000	n/a	4,612,867	4,250,000

FEB 28 91

-73-

FAIRBANKS

- Phone conversation with Jon Paul Stenberg 2-28-91 pm
- Sent Table of Utility Statistics, 1990 that supplies most of the pertinent information.
- Fairbanks electricity acquired from city utility, North Pole utility, Healy, and Anchorage intertie. Coal fired, steam turbines consumed ~95% of the interdepartmental water figure
- April 1, 1990 Census figure = 30,843 for city and Ft. Wainw Mark Groundstead (sp.?). Other statistics from Mark (452-4761 x 212) include 2.74 people / household for entire Fairbanks North Star Borough. State census = 28,853
- College Utilities Corp., 479-3118, Cindy Lester, 1990
- Ft. Wainwright, 353-7207, has own water utility
- Eielson A.F.B. 377-1110, has own water utility
- Lakeview Trailer court is another utility
- UAF has its own utility as well

Interdepartmental W-U x 95% = fossil fuel w-u = 45,848,940 x .9
= 43,556,493 gallo

∴ Commercial W-U total = = .12 MGD

(.05 x 45,848,940) + 642,247,215

= 2,292,447 + 642,247,215 = 644,539,662 = 1.77 MGD

Adj. est. use = 617,769,740 Ga
= 1.6925 MG

Residential W-U total = 216,280,369 = .5925 MGD

860,820,031 Gallons

Adj. est. use 214,344,189 G
= .5872 MG

Est 3.3% Industrial = 28,706,102 Gallons = .0786 MGD

CITY: Juneau, City and Borough (CBJ)

CONTACTS:

1) Grant Ritter, CBJ Utilities, 780-6888
2) Rick Noll, ADGGS Juneau, 465-2520

WATER SOURCES:

1) Salmon Creek - routed from AK. Electric Power and Light tailrace to CBJ treatment facility. Supplies an area from the hospital near Salmon Creek to the Mendenhall Valley and Auke Bay.
2) Last Chance Basin Well Field - 5 wells located near Gold Creek. Supplies downtown area of Juneau, West Juneau, and Douglas.
3) Southeast Utilities (SEU) - A total of 668 units supplied until SEU joined CBJ utilities in August 1990. This included four trailer parks, one condominium unit, three apartment complexes, the Department of Transportation, and a business complex.
4) Three minor private systems supplying trailer parks.

OTHER SOURCES

Three minor public water supplies were examined in addition to the suppliers already mentioned. Water-Use (W-U) from these suppliers is not contained in this report because their individual daily supply averages were less than 10,000 gallons.

CUSTOMER INFORMATION

Utility	Residential Customers Served	Commercial Customers Served
CBJ	833 Condos	
	4,085 Flat Rate	
		647 Assorted
SEU	666	2 Miscellaneous
Total	**5,584**	**649**

FACTS and CALCULATIONS

1) Total W-U calculated from CBJ Utilities supplied to DNR.
2) Commercial W-U summed from CBJ meter readings.
3) Domestic W-U was estimated by subtracting commercial W-U from total estimated delivered W-U. The commercial W-U was metered but the total amount of water delivered was unknown. To obtain an estimate of deliveries, the average ratio of deliveries to withdrawals for five cities that had this data in the 1990 EUOWITUS, .786, was multiplied times the amount of withdrawals for Juneau to obtain the estimated amount of deliveries:

   4.36 MGD withdrawn X .786 = 3.43 MGD delivered

   The commercial aspect of deliveries was known, so to get domestic deliveries, commercial deliveries were subtracted from total estimated deliveries:

   3.43 MGD total estimated deliveries - 1.02 MGD metered commercial deliveries = 2.41 MGD estimated domestic deliveries

4) CBJ claims virtually no industrial W-U. Examination of the Standard Industrial Classification codes for industrial W-U indicates that industrial W-U does actually occur in Juneau. I used an estimate of one-fifth of total commercial W-U was actually industrial. Therefore, the actual metered commercial W-U was split 1:5 as the ratio of industrial to commercial W-U:

1.02 MGD metered commercial X .20 = **.20 MGD estimated industrial** W-U

Estimated commercial W-U = 1.02 MGD - .20 MGD = **.82 MGD.**

5) The number of domestic households was obtained from CBJ accounts department.

6) Some domestic services switched to CBJ in mid-1990. Estimated W-U before this time was calculated and added to the CBJ monthly use.

7) The number of people/household was obtained from CBJ Utilities study. This number is **3.3.**

8) The average single family Juneau unit used 7,400 gallons/month.

9) An average single family household W-U = 7400 gallons per month / 30 days per month / 3.3 people per household = 75 gallons/person/day

10) The average trailer park unit used 10,300 gallons/month.

11) Average trailer park unit W-U = 10,300 gallons per month / 30 days per month /3.3 people per household = 104 gallons/person/day.

12) Because the number of trailer park units are far fewer than single family units, and the per capita use for trailer units is 29 gallons per capita per day higher, the residential per capita use for CBJ will be estimated at 30 percent of the difference between trailer and single family unit use higher than single family residence use:

29 X .30 = 9 gallons per capita per day

75 + 9 = 84 gallons per capita per day

13) Total per capita use for CBJ:

4.36 MGD withdrawn / 15,350 capita = **284 gallons per capita per day**

14) Cruise ship facilities used 10.5 million gallons during the summer months which = .07 MGD.

15) Harbor area activities used 11 million gallons during the year which = .03 MGD.

WATER SUPPLY:

1) All entries in this category were obtained from CBJ Utilities and SEU except the number of facilities in W-U database. The AKWUDS program had data from 3 public supply withdrawal points which are serviced by 2 water treatment facilities.

COMPARISON OF 1985 TO 1990 SUMMARIES

1) Total Population - the 1985 reported census according to state statistics was 29,000. The 1990 federal census data for Juneau is 26,750 while the state figure is 28,881. Both state and federal figures fall within the 10 percent margin of error.

2) GW Population Served - In 1985, there were 5,500 people served. In 1990, there were **10,240** people served. This was an increase of 86 percent. CBJ Utility has been encouraging self-supplied domestic water-users to hook up to the public utility.

3) SW Population Served - In 1985, there were 7,100 people served. In 1990, there were **5,110** people served. This was a decrease of 28 percent. The change is partially due to new services receiving GW instead of SW, numerous SW customers being converted to GW, and a discrepancy between 1985 and 1990 reported data .

4) GW Withdrawals-Fresh - In 1985, 1.88 MGD were used while in 1990, **2.78 MGD** were used. The margin of error is 48 percent. The 1985 EUOWITUS shows total withdrawals equalling total deliveries which is not the case for the 1990 EUOWITUS. W-U data for 1986 indicate an amount close to the 1985 amount for total withdrawals. Conjecturing under this premise, the increase in this amount is attributable primarily to a 22 percent

increase in the population served where the GW population served has increased 86 percent while the SW population served has decreased 28 percent. The ratio of GW to SW withdrawals has remained relatively constant between 1985 and 1990, 1.88 and 1.76 respectively.

5) GW Withdrawals-Saline - no reported use in this category in 1985 nor 1990.

6) SW Withdrawals-Fresh - In 1985, 1.00 MGD were used. In 1990, 1.58 MGD were used. The margin of error is a 58 percent increase. The increase in this amount is attributable mostly to an increase in the population served as the ratio of GW to SW withdrawals remained relatively constant from 1985 and 1990 reported W-U data.

7) Domestic - In 1985, deliveries to domestic uses totalled 1.14 MGD. In 1990, this figure was estimated at 2.41 MGD. This is a 111 percent increase in estimated domestic W-U. The change is most likely attributable to different estimation methods.

8) Commercial - In 1985, deliveries to commercial uses was estimated at 1.60 MGD. In 1990, estimated commercial deliveries was estimated at .82 MGD. That is a 49 percent decrease in estimates. The change is attributable to different estimation methods as well as a possible slowdown of the Juneau economy.

9) Industrial - In 1985, deliveries to industrial uses was estimated at .14 MGD. In 1990, estimated industrial deliveries was estimated at .20 MGD. That is a 43 percent increase in estimates. The change is attributable to different estimation methods.

10) Fossil Fuel - No W-U for fossil fuel power generation in Juneau for 1985 nor 1990.

11) Nuclear - No W-U for nuclear power generation in Juneau for 1985 nor 1990.

12) Sewage Treatment - In 1985, effluent from sewage treatment plants was 4.29 MGD. In 1990, the figure for similar use was 4.19 MGD. A decrease of 2 percent is negligible.

13) Number of Public Sewage Treatment Facilities - This number changed from two in 1985 to three in 1990. The Mendenhall Valley wastewater treatment facility came on line in 1988. The amount of effluent increase from this treatment plant coming on line was negated by the decrease in the amount of wastewater contributed to the system from storm drains that were diverted from the treatment facility to the ocean instead.

14) Per capita Use - The 1985 Euowitus calculated 229 gallons. The 1990 estimate is 284. The 1990 per capita use is estimated at 24 percent less than 1985 levels. This margin of error could be attributable to a low population estimate or an increase in commercial and industrial W-U. The later theory seems more plausible because estimated domestic per capita use essentially remained the same (90 gallons in 1985 to 84 gallons in 1990, while the estimated population increased. An increase in population would demand an increase in commerce and industry.

JUNEAU, CITY & BOROUGH

ESTIMATED USE OF WATER IN THE UNITED STATES
1990 – DATA COLLECTION FORM – 1990

68/6/2

COUNTY or HUC NAME C B Juneau COUNTY or HUC CODE _____ TOTAL POPULATION (in thousands) 26.75 Fed
28.88 State

* UNITS IN MGD TO TWO DECIMAL PLACES (UNLESS OTHERWISE SPECIFIED)

	WATER SUPPLY	DOMESTIC	COMMERCIAL	INDUSTRIAL	MINING	FOSSIL FUEL	NUCLEAR	HYDROELECTRIC	LIVESTOCK	ANIMAL SPECIALTIES	IRRIGATION	SEWAGE TRMT.	RESERVOIR EVAP
Total Water Use													
GW Withdrawals – Fresh	2.78												
GW Withdrawals – Saline	ø												
SW Withdrawals – Fresh	1.58												
SW Withdrawals – Saline	ø												
GW – Population Served (thous.)	10.24												
SW – Population Served (thous.)	5.11												
Deliveries from Water Supply:		2.41	.82	.20		0	0						
Consumptive Use – Fresh													
Consumptive Use – Saline													
Conveyance Loss													
Power Generation (GWh)													
Acres Irrigated – Sprayed (thous.)													
Acres Irrigated – Flooded (thous.)													
Number of Facilities	2												
# Facilities in WU Database	2											3	
WW total returns from municipal fac.												4.19	
# of Public WW Facilities												3	
# Industrial & Other WW Facilities												0	
Reclaimed Sewage													

TO: See Distribution
CC:
From: Robert R. Pierce, Hydrologist, Doraville, GA (RRPIERCE)
Date: Thursday, April 04, 1991 08:21:28
Subject: EUCWITUS DOCUMENTATION FORM

E U C W I T U S 1 9 9 0 ***** D O C U M E N T A T I O N

COMPLETE LIST OF SOURCES - (report ALL data received (incl.coefficients) that were used to complete the information for 1990 EUCWITUS)

** 1 **

CATEGORIES OF USE (IN,DO,IR etc): PWS, DO, IN, CO, ST.

TYPE (pumpage,acres,coefficient): Pumpage

AGENCY City & Borough of Juneau

CONTACT PERSON Grant Ritter, 780-6088

YEAR OF DATA 1990

ACCURACY POOR

AERIAL EXTENT (site-specific, county, HUC, etc) CITY & BOROUGH OF JUNEAU incl. Douglas, Auke, Bay, & Mendenhall R

FORMAT (printout, publication, verbal communication, etc)

** 2 **

CATEGORIES OF USE (IN,DO,IR etc):

TYPE (pumpage,acres,coefficient):

AGENCY

CONTACT PERSON

YEAR OF DATA

ACCURACY

AERIAL EXTENT (site-specific, county, HUC, etc)

FORMAT (printout, publication, verbal communication

REPORTED EUCWITUS INFORMATION
- (From the listed sources above please explain how the 'reported' figures for COUNTY, HUC & AQUIFER were derived? In each case referal to any data (incl. coefficients) must come from the "COMPLETE LIST OF SOURCES".

-- WATER SUPPLY --

WITHDRAWALS	4.36 MGD
POPULATION SERVED	15,35
NUMBER OF FACILITIES	2

-- COMMERCIAL --

WITHDRAWALS	1.04
DELIVERIES	0.82
CONSUMPTIVE USE	.22

-- DOMESTIC --

WITHDRAWALS	3.06
DELIVERIES	2.41
CONSUMPTIVE USE	0,65

-- INDUSTRIAL --	
WITHDRAWALS	.25
DELIVERIES	.20
CONSUMPTIVE USE	.05
NUMBER OF FACILITIES	
RECLAIMED WASTEWATER	

-- THERMOELECTRIC --	
WITHDRAWALS	
DELIVERIES	
CONSUMPTIVE USE	
NUMBER OF FACILITES	

-- MINING --	
WITHDRAWALS	
CONSUMPTIVE USE	

-- HYDROELECTRIC --	
TOTAL WATER USE	
POWER GENERATION	
NUMBER OF FACILITIES	

-- LIVESTOCK --	
WITHDRAWALS	
DELIVERIES	
CONSUMPTIVE USE	

-- IRRIGATION --	
WITHDRAWALS AMOUNTS	
CONSUMPTIVE USE	
CONVEYANCE LOSSES	
ACRES IRRIGATED (spray & flood)	
RECLAIMED WASTEWATER	

-- SEWAGE TREATMENT --	
NUMBER OF FACILITES	3
TOTAL WASTE WATER RETURNS	4.19
NUMBER OF PUBLIC WASTE WATER FACILITIES	3
NUMBER INDUSTRIAL & OTHER WASTE WATER FACILITIES	0
AMOUNT OF WATER RETURNED TO BENEFICIAL USE	

-- RESERVOIR EVAPORATION --	
CONSUMPTIVE USE	
SURFACE AREA	

TO: Distribution list.

Wayne B. Solley, Chief, BWUI, Reston, VA (WBSOLLEY)
David W. Litke, Hydrologist, Lakewood, CO (DWLITKE)
Nancy L. Barber, Hydrologist(Geologist), Jackson, MS (NLBARBER)
Leslie D. Patrick, Hyd (SA), Anchorage, AK (LDPATRICK)

SMTP: Recipient(s) list.

1990 AKWUDS Monthly and Yearly Water-Use Calculations Worksheet

Facility Name: JUNEAU, CITY & BOROUGH OF 8TH ST. & WELLS 1,2,4,5

File Type and Number: ADL 44439 Sequence #.: 01 W

DATE	DAYS	METER READING	GALLONS	MGD	MONTH
12/31/89	-	-	-	-	-
1/31/90	31	-	61,074,000	1.970129	JAN
2/28/90	28	-	76,168,000	2.720286	FEB
3/31/90	31	-	49,634,000	1.601097	MAR
4/30/90	30	-	26,107,000	0.870233	APR
5/31/90	31	-	59,363,000	1.914935	MAY
6/30/90	30	-	73,225,000	2.440833	JUN
7/31/90	31	-	55,350,000	1.785484	JUL
8/31/90	31	-	69,365,000	2.237581	AUG
9/30/90	30	-	50,193,000	1.673100	SEP
10/31/90	31	-	75,435,000	2.433387	OCT
11/30/90	30	-	83,188,000	2.772933	NOV
12/31/90	31	-	16,923,000	0.545903	DEC
TOTALS:	365	-	696,025,000	1.906918	1990

MAX: 2.772933 MIN: 0.545903

1990 AKWUDS Monthly and Yearly Water-Use Calculations Worksheet

Facility Name: JUNEAU, CITY & BOROUGH OF WELL #3

File Type and Number: ADL 100066 Sequence # : 01 W

DATE	DAYS	METER READING	GALLONS	MGD	MONTH
12/31/89	-	-	-	-	-
1/31/90	31	-	21,866,000	0.705355	JAN
2/28/90	28	-	38,433,000	1.372607	FEB
3/31/90	31	-	17,391,000	0.561000	MAR
4/30/90	30	-	32,459,000	1.081967	APR
5/31/90	31	-	17,023,000	0.549129	MAY
6/30/90	30	-	36,756,000	1.225200	JUN
7/31/90	31	-	15,449,000	0.498355	JUL
8/31/90	31	-	20,475,000	0.660484	AUG
9/30/90	30	-	31,221,000	1.561050	SEP
10/31/90	31	-	26,377,000	0.850871	OCT
11/30/90	10	-	5,828,000	0.582800	NOV
12/31/90	31	-	33,466,000	1.079548	DEC
TOTALS:	335	-	296,744,000	0.885803	
	365			0.812997	1990
MAX:		1.561050	MIN:	0.498355	

1990 AKWUDS Monthly and Yearly Water-Use Calculations Worksheet

Facility Name: JUNEAU, CITY & BOROUGH OF SALMON CREEK

File Type and Number: LAS 1942 Sequence # : 01 W

DATE	DAYS	METER READING	GALLONS	MGD	MONTH
12/31/89	-	-	-	-	-
1/31/90	31	-	46,071,000	1.486161	JAN
2/28/90	28	-	62,013,000	2.214750	FEB
3/31/90	31	-	42,456,000	1.369548	MAR
4/30/90	30	-	50,254,000	1.675133	APR
5/31/90	31	-	34,006,000	1.096968	MAY
6/30/90	30	-	18,514,000	0.617133	JUN
7/31/90	31	-	54,407,000	1.755065	JUL
8/31/90	31	-	45,082,000	1.454258	AUG
9/30/90	30	-	40,707,000	2.035350	SEP
10/31/90	31	-	13,976,000	0.450839	OCT
11/30/90	16	-	25,564,000	1.597750	NOV
12/31/90	31	-	71,158,000	2.295419	DEC
TOTALS:	341	-	504,208,000	1.478616	
	365			1.381392	1990
MAX:		2.295419	MIN:	0.450839	

1990 AKWUDS Monthly and Yearly Water-Use Calculations Worksheet

Facility Name: JUNEAU, CITY & BOROUGH OF MENDENHALL VALLEY WWTP

File Type and Number: LAS 12456 Sequence # : 01 W

DATE	DAYS	METER READING	GALLONS	MGD	MONTH
12/31/89	-	-	-	-	-
1/31/90	31	-	59,822,000	1.929742	JAN
2/28/90	28	-	47,746,000	1.705214	FEB
3/31/90	31	-	50,270,000	1.621613	MAR
4/30/90	30	-	55,353,000	1.845100	APR
5/31/90	31	-	53,132,000	1.713935	MAY
6/30/90	30	-	50,184,000	1.672800	JUN
7/31/90	31	-	59,679,000	1.925129	JUL
8/31/90	31	-	80,680,000	2.602581	AUG
9/30/90	30	-	78,450,000	2.615000	SEP
10/31/90	31	-	72,838,000	2.349613	OCT
11/30/90	30	-	89,970,000	2.999000	NOV
12/31/90	31	-	64,453,000	2.079129	DEC
TOTALS:	365	-	762,577,000	2.089252	
					1990
MAX:		2.999000	MIN:	1.621613	

1990 AKWUDS Monthly and Yearly Water-Use Calculations Worksheet

Facility Name: JUNEAU, CITY & BOROUGH OF THANE WASTEWATER T. P.

File Type and Number: LAS 12457 Sequence # : 01 W

DATE	DAYS	METER READING	GALLONS	MGD	MONTH
12/31/89	-	-	-	-	-
1/31/90	31	-	61,679,000	1.989645	JAN
2/28/90	28	-	57,377,000	2.049179	FEB
3/31/90	31	-	80,870,000	2.608710	MAR
4/30/90	30	-	44,810,000	1.493667	APR
5/31/90	31	-	40,173,000	1.296037	MAY
6/30/90	30	-	45,899,000	1.529967	JUN
7/31/90	31	-	56,152,000	1.811355	JUL
8/31/90	31	-	64,895,000	2.093387	AUG
9/30/90	30	-	79,292,000	2.643067	SEP
10/31/90	31	-	85,054,000	2.743677	OCT
11/30/90	30	-	59,950,000	1.998333	NOV
12/31/90	31	-	64,688,000	2.086710	DEC
TOTALS:	365	-	740,845,000	2.029712	1990
MAX:		2.743677	MIN:	1.296037	

JUNEAU AREA WATER USE 1990 SUMMARY

In 1990 the City and Borough of Juneau (CBJ) water utilities obtained water from two sources: Salmon Creek, a surface water source, and the Last Chance Basin well field. Salmon Creek water is routed from the Alaska Electric Power and Light tailrace to the CBJ treatment facility. Generally this represents 33.3% of the water used and supplies an area from the hospital near Salmon Creek to the Mendenhall Valley and Auke Bay. The Last Chance Basin well field consists of 5 wells located near Gold Creek just east of downtown Juneau, and supplies 66.7% of the water used by the CBJ. The well field supplies the downtown area, West Juneau, and Douglas. In the spring, the entire CBJ water system is typically supplied by the well field because of high turbidity levels in the Salmon Creek water.

In 1990 there were four other minor private water supply systems located in the Lemon Creek area. These consisted mainly of private trailer parks supplying water to their spaces. One exception to this was Southeast Utilities. They supplied surface water to 4 trailer parks, one condominium unit, three apartment complexes, the Department of Transportation, and a business complex, for a total of 668 units. Most of these systems were switched to CBJ water sometime in 1990. As of March 1991, only two trailer parks were still using their own system. Southeast Utilities switched over to CBJ water in August of 1990.

Some commercial users are self supplied but do not generally use enough water to include in the water use data results. They consist of small office complexes and stores predominantly using wells.

Self-supplied residential use is mainly located in the back loop area of the Mendenhall Valley, north of Auke Bay, North Douglas Island, and the Thane area. CBJ water lines have been laid to most of these areas, and within the next few years it is expected that more households will switch from private wells to the CBJ system.

Total water use was calculated from the monthly totals supplied to DNR by the CBJ Utilities. Commercial accounts are metered and billed at $13.00 per month for the first 4,000 gallons, then $1.50 per 1,000 gallons over the 4,000 gallon base. The total water use for the commercial accounts was summed from the meter readings. The domestic use was calculated by subtracting the commercial use from the total water used. The number of domestic households was obtained from the CBJ accounts department. Domestic water is not metered and is billed at a flat rate of $17.00 per month. Water systems that were switched in mid-1990 to the CBJ system had estimated water use calculated for the months prior to the switch. These amounts were added into the CBJ monthly use.

The average number of people per household and the average water use were obtained from a CBJ Utilities study. These were used to calculate water use when actual use was unknown. An example of this was when estimates were used to determine the quantity of water that a private system supplied to a trailer park. The number of spaces supplied was multiplied by the average daily use to estimate the total use for the system. In the Juneau area, it was found that the average single family unit used 7,400 gallons of water per month, and the average trailer park unit used 10,300 gallons per month, or 40 percent more.

The new Surface Water Treatment Regulations will require Salmon Creek water to be treated by June 29, 1993, to remove water-borne pathogens and turbidity. This treatment

will probably cost in excess of $10 million. Because of this, there is a possibility that the entire CBJ system may be supplied from the Last Chance Basin well field in the future. The CBJ has recently requested that their well field water right appropriation be increased from 5 MGD to 12 MGD.

Miscellaneous water users on the CBJ system include the cruise ship facilities and the harbors. Cruise ships used 10.5 million gallons in 1990 for an average of 0.07 MGD during the summer months. All Juneau area harbors used 11 million gallons in 1990, or an average of 0.03 MGD.

Future water use in the Juneau area may include seafood processors and the AJ mine. Seafood processors would probably use the CBJ system. The AJ mine has applied to divert surface waters out of Gold Creek and use these waters in the mine. Echo Bay Exploration has requested an average use of 23 cfs. This water would be used for both industrial and domestic supplies.

AREA: Kenai Peninsula - summation of:
Homer, Kenai, Seward, and Soldotna.

POPULATION (from the federal census)

City	Total Thousands	GW-Served Thousands	SW-Served Thousands
Homer	3.66	0.00	3.14
Kenai	6.33	3.29	0.00
Seward	2.70	2.05	0.61
Soldotna	3.48	3.24	0.00
Total	**16.17**	**8.58**	**3.75**

Total Population Served = **12.33 (thousands)**

Total Kenai Peninsula Borough = **40.80 (thousands)**

WITHDRAWALS - FRESH

City	Groundwater MGD	Surface Water MGD		Number of Facilities
Homer	-	.49		1
Kenai	.73	-		1
Seward	1.24	.38		7
Soldotna	.58	-		7
Totals	**2.55**	**.87**	**3.42 MGD**	**16**

Per capita use: 3.42 MGD / 12,330 capita = **277 gallons per capita per day**

DELIVERIES FROM WATER SUPPLY

City	Domestic MGD	Commercial MGD	Industrial MGD	
Homer	.16	.20	.04	
Kenai	.33	.26	.07	
Seward	.77	.44	.31	
Soldotna	.24	.23	.05	
Total	**1.50**	**1.13**	**.47**	**3.10 MGD**

Domestic per capita use: 1.50 MGD / 12,330 capita = 122 gallons per capita per day

RETURNS FROM SEWAGE TREATMENT

City	MGD
Homer	.31
Kenai	.82
Seward	.66
Soldotna	.56
Total	**2.35**

FACTS and CALCULATIONS

1) Total amount of water withdrawn per year = **3.42 MGD.**
2) Total amount of water delivered per year = **3.10 MGD.**
3) Ratio of estimated total amount of water delivered to total reported amount of water withdrawn = 3.10 / 3.42 = 91 percent.
4) The estimated population served as part of the entire population = 12.33 / 16.17 = 76 percent.
5) The average number of people per household on the Kenai Peninsula is estimated at 2.78.
6) No local fossil fuel electric generation occurs on the Kenai Peninsula. Electricity is obtained through Chugach Electric Association gas turbine station at Beluga, Cooper Lake hydroelectric, or Bradley Lake hydroelectric in the future.
7) No nuclear generation plants in the state of Alaska.

WATER SUPPLY

1) Entries in this category were obtained directly from the cities or estimated from available data.

COMPARISON OF 1985 TO 1990 SUMMARIES

The data from the cities of Homer, Kenai, Seward, and Soldotna were aggregated to achieve total W-U for the Kenal Peninsula.

1) Total Population - the 1985 EUOWITUS reported county population statistic was 39,200. The 1990 federal census data for the Kenai Peninsula Borough 40,802 while the state figure is 40,312. Both the state and federal figures fall within the 10 percent margin of error.
2) GW Population Served - In 1985, there were 8,600 people served. In 1990, there were 8,580 people served. This was virtually no change.
3) SW Population Served - In 1985, there were 6,070 people served. In 1990, there were 3,750 people served. This was a decrease of 38 percent. The change can be attributed to less people receiving surface water public supplies or an underestimation of the 1990 surface W-U.
4) Per Capita Use - the 1985 figure was 200 gallons per person per day. The 1990 figure is **277 gallons per person per year.** This is a 39 percent increase. This discrepancy is due to different methods of estimating the population served.
5) GW Withdrawals-Fresh - In 1985, 2.03 MGD were used while in 1990, 2.55 MGD were used. The margin of error is a 26 percent increase. There appears to be an increase of ground water withdrawals for public supply in 1990 as compared to 1985.
6) GW Withdrawals-Saline - no reported use in this category in 1985 nor 1990.
7) SW Withdrawals-Fresh - In 1985, .90 MGD were used. In 1990, .87 MGD were used. The margin of error is negligible.
8) SW Withdrawals-Saline - no reported use in this category in 1985 nor 1990.
9) Total Withdrawals - In 1985, 2.93 MGD were reported. In 1990, 3.42 was reported to be withdrawn. That is a 17 percent increase between 1985 and 1990. This change could be due to a general increase in W-U.
10) Per Capita Use - The 1985 estimate was 200 while the 1990 figure was 277. A 39 percent increase since 1985 could be attributable to a low population served estimate or an increase in W-U. It is more likely due to a relative increase in W-U because the domestic per capita use essentially remained the same. It was 112 in 1985 versus 122 in 1990. The increase in W-U came in the commercial/industrial area.

11) Domestic - In 1985, deliveries to domestic uses totalled 1.64 MGD. In 1990, this figure was estimated at 1.50 MGD. This is a 9 percent decrease in estimated domestic W-U.

12) Commercial - In 1985, deliveries to commercial uses was estimated at 1.01 MGD. In 1990, estimated commercial deliveries was estimated at 1.13 MGD. This is a 12 percent increase in estimates. The change is most likely attributable to the use of different estimation methods.

13) Industrial - In 1985, deliveries to industrial uses was estimated at .26 MGD. In 1990, estimated industrial deliveries was estimated at .47 MGD. That is an 81 percent increase in estimates. The change is most likely attributable to different estimation methods.

14) Total Deliveries - 1985 estimated total deliveries were 2.93 MGD. The 1990 estimated figure is 3.10 MGD. That is a 6 percent increase in total deliveries.

15) Fossil Fuel - No W-U for fossil fuel power generation on the Kenai Peninsula for 1985 nor 1990.

16) Nuclear - No W-U for nuclear power generation on the Kenai Peninsula for 1985 nor 1990.

17) Sewage Treatment - In 1985, effluent from sewage treatment plants was 2.26 MGD. In 1990, the figure for similar use was 2.35 MGD. An increase of 4 percent is negligible.

18) Number of Public Sewage Treatment Facilities - This number remained the same in 1990 as in 1985. The 1985 EUOWITUS listed 7 other facilities. This year, no other facilities are listed. This category was optional for the 1990 DGGS EUOWITUS.

KENAI PENINSULA

ESTIMATED USE OF WATER IN THE UNITED STATES
1990 - DATA COLLECTION FORM - 1990

68/6/2

COUNTY or HUC NAME _____ COUNTY or HUC CODE _____ TOTAL POPULATION 16.17 (in thousands)

40.80 Entire Borough

* UNITS IN MGD TO TWO DECIMAL PLACES (UNLESS OTHERWISE SPECIFIED)

	WATER SUPPLY	DOMESTIC	COMMERCIAL	INDUSTRIAL	MINING	FOSSIL FUEL	NUCLEAR	HYDROELECTRIC	LIVESTOCK	ANIMAL SPECIALTIES	IRRIGATION	SEWAGE TRMT.	RESERVOIR EVAP
Total Water Use													
GW Withdrawals - Fresh	2.55												
GW Withdrawals - Saline	—												
SW Withdrawals - Fresh	.87												
SW Withdrawals - Saline	—												
GW - Population Served (thous.)	8.58												
SW - Population Served (thous.)	3.75												
Deliveries from Water Supply:		1.50	1.13	.47		0	0						
Consumptive Use - Fresh													
Consumptive Use - Saline													
Conveyance Loss													
Power Generation (GWh)													
Acres Irrigated - Sprayed (thous.)													
Acres Irrigated - Flooded (thous.)													
Number of Facilities	16												
# Facilities in WU Database	16											4	
WW total returns from municipal fac.												2.35	
# of Public WW Facilities												4	
# Industrial & Other WW Facilities													
Reclaimed Sewage													

TO: See Distribution
CC:
From: Robert R. Pierce, Hydrologist, Doraville, GA (RRPIERCE)
Date: Thursday, April 04, 1991 08:21:29
Subject: EUCWITUS DOCUMENTATION FORM

E U C W I T U S 1 9 9 0 ***** D O C U M E N T A T I O N

COMPLETE LIST OF SOURCES - (report ALL data received (incl.coefficients) that were used to complete the information for 1990 EUCWITUS)

** 1 **

CATEGORIES OF USE (IN,DO,IR etc): PWS, CO, DO, IN, FP, & ST

TYPE (pumpage,acres,coefficient): pumpage, coefficients, sums

AGENCY KENAI PENINSULA (HOMER, KENAI, SOLDOTNA, & SEWARD)

CONTACT PERSON See subordinate sheets

YEAR OF DATA 1990

ACCURACY POOR

AERIAL EXTENT (site-specific, county, HUC, etc KENAI PENINSULA

FORMAT (printout, publication, verbal communication, etc) UTILITY REPORTS, ORAL COMMUNICATIONS

** 2 **

CATEGORIES OF USE (IN,DO,IR etc):

TYPE (pumpage,acres,coefficient):

AGENCY

CONTACT PERSON

YEAR OF DATA

ACCURACY

AERIAL EXTENT (site-specific, county, HUC, etc)

FORMAT (printout, publication, verbal communication

REPORTED EUCWITUS INFORMATION
- (From the listed sources above please explain how the 'reported' figures for COUNTY, HUC & AQUIFER were derived? In each case referal to any data (incl. coefficients) must come from the "COMPLETE LIST OF SOURCES".

-- WATER SUPPLY --	
WITHDRAWALS	3.42
POPULATION SERVED	12.33
NUMBER OF FACILITIES	16
-- COMMERCIAL --	
WITHDRAWALS	1.26
DELIVERIES	1.13
CONSUMPTIVE USE	.13
-- DOMESTIC --	
WITHDRAWALS	1.66
DELIVERIES	1.50
CONSUMPTIVE USE	.16

-- INDUSTRIAL --	
WITHDRAWALS	.52
DELIVERIES	.47
CONSUMPTIVE USE	.05
NUMBER OF FACILITIES	
RECLAIMED WASTEWATER	

-- THERMOELECTRIC --	
WITHDRAWALS	
DELIVERIES	
CONSUMPTIVE USE	
NUMBER OF FACILITES	

-- MINING --	
WITHDRAWALS	
CONSUMPTIVE USE	

-- HYDROELECTRIC --	
TOTAL WATER USE	
POWER GENERATION	
NUMBER OF FACILITIES	

-- LIVESTOCK --	
WITHDRAWALS	
DELIVERIES	
CONSUMPTIVE USE	

-- IRRIGATION --	
WITHDRAWALS AMOUNTS	
CONSUMPTIVE USE	
CONVEYANCE LOSSES	
ACRES IRRIGATED (spray & flooc)	
RECLAIMED WASTEWATER	

-- SEWAGE TREATMENT --	
NUMBER OF FACILITIES	
TOTAL WASTE WATER RETURNS	
NUMBER OF PUBLIC WASTE WATER FACILITIES	
NUMBER INDUSTRIAL & OTHER WASTE WATER FACILITIES	
AMOUNT OF WATER RETURNED TO BENEFICIAL USE	

-- RESERVOIR EVAPORATION --	
CONSUMPTIVE USE	
SURFACE AREA	

TO: Distribution list.

Wayne B. Solley, Chief, BWUI, Reston, VA (WBSOLLEY)
David W. Litke, Hydrologist, Lakewood, CO (DWLITKE)
Nancy L. Barber, Hydrologist(Geologist), Jackson, MS (NLBARBER)
Leslie D. Patrick, Hyd (SA), Anchorage, AK (LDPATRICK)

SHIP: Recipient(s) list.

CITY: Homer

CONTACTS:

1) Richard Hammer, Public Works Department, 235-3170
2) Dave Bolt, Water/Sewer Operator, 235-3174

WATER SOURCES

1) Bridge Creek Dam - Water withdrawn from reservoir and sent to treatment facility. Water is then piped into supply system for delivery.

CUSTOMER INFORMATION

	Residential Customers Served	Commercial Customers Served	Industrial Customers Served	
	693 Single Family	208	3	
	105 Multi-Family			
Total	798	208	3	1,009
Amount Delvrd:	59,819,716	71,854,825	14,144,600 gals.	

FACTS and CALCULATIONS

1) Total population for Homer from the federal census = 3,660. From the state census, the population figure = 4,513.
2) The population served was extrapolated from the Homer Wastewater Facilities Plan, Table IV-3, "Estimated Design Loadings for Average Day Peak Month Condition". The population design for 1987 was 2,480. The number of sewer customers in 1988 was 832 while in 1990 it was 904. That's an average increase of 36 sewer customers per year. Therefore, the average number of sewer customers in 1987 would be 832 - 36 = 796. With 2,480 population served by sewer in 1987, the 1990 population served by sewer in 1990 = (2480 X 904) / 796 = 2816. Extrapolating for population served using water customers from 1988 and 1990:
   sewer customers / water customers = 904/1009 = .896
   water population served '90 ~ = sewer population / .896 = 2816/.896 = **3,143**
3) Total water withdrawn from SW source = 180,308,000 gallons = **.49 MGD.**
4) Domestic W-U consists of the following residential categories listed in order of decreasing quantities, respectively: single-family in-town, multi-family in-town, single-family out-of-town, and spit residence.
   59,819,716 gallons / 365 days = 163,890 gallons per day = **.16 MGD.**
5) Per capita use:
   .49 MGD / 3,143 capita = **156 gallons per capita per day**
   Domestic per capita use:
   .16 MGD / 3,143 capita = 51 gallons per capita per day
6) Commercial W-U consists of the following categories listed in order of decreasing quantities, respectively: businesses, government on spit, other government, bulk water

sales, hotels and motels, commerce on spit, hospitals, city public works, churches, police, fire hall, city campground, museum, and library.

71,854,825 gallons / 365 days = 196,863 gallons per day = **.20 MGD.**

7) Industrial W-U consists primarily of seafood processing plants.

14,144,600 gallons / 365 days = 38,752 gallons per day = **0.04 MGD**

8) The average single family Homer unit used 154 gallons/day. This data was calculated from reported W-U for single family residences in the Homer area.

9) No local fossil fuel generated electrical power stations. Electricity is supplied to Homer from Chugach Electric Association from Bernice Lake, Cooper Lake, Beluga, and Anchorage area powerplants.

10) There are no nuclear power electrical generators in southcentral Alaska.

11) The sewage treatment facility discharged 112,260,000 gallons of secondarily treated effluent into Kachemak Bay. All Homer Spit canneries discharge their processing water into the bay.

112,260,000 gallons per year / 365 days per year = **.31 MGD.**

WATER SUPPLY:

1) All entries in this category were obtained from the Homer Department of Public Works. Their report is one of the finest in the state. It is detailed and concise. All data is accepted as is and has not been modified.

COMPARISON OF 1985 TO 1990 SUMMARIES

1) Homer is a located on the Kenai Peninsula. The data for Homer, Kenai, Seward, and Soldotna will be aggregated and compared to the 1985 EUOWITUS under a unique documentation sheet.

HOMER

SOURCE : BRIDGE CREEK - DAM RICHARD HAMMER, 235-3170

ESTIMATED USE OF WATER IN THE UNITED STATES
1990 - DATA COLLECTION FORM - 1990

6/8/12

COUNTY or HUC NAME _____ COUNTY or HUC CODE _____ TOTAL POPULATION 3.66 (in thousands)

* UNITS IN MGD TO TWO DECIMAL PLACES (UNLESS OTHERWISE SPECIFIED)

	WATER SUPPLY	DOMESTIC	COMMERCIAL	INDUSTRIAL	MINING	FOSSIL FUEL	NUCLEAR	HYDROELECTRIC	LIVESTOCK	ANIMAL SPECIALTIES	IRRIGATION	SEWAGE TRMT.	RESERVOIR EVAP
Total Water Use													
GW Withdrawals - Fresh	—												
GW Withdrawals - Saline	—												
SW Withdrawals - Fresh	.49												
SW Withdrawals - Saline	—												
GW - Population Served (thous.)	—												
SW - Population Served (thous.)	3.14												
Deliveries from Water Supply:		.16	.20	.04		[illegible]							
Consumptive Use - Fresh													
Consumptive Use - Saline													
Conveyance Loss													
Power Generation (GWh)													
Acres Irrigated - Sprayed (thous.)													
Acres Irrigated - Flooded (thous.)													
Number of Facilities	1												
# Facilities in WU Database	1											1	
WW total returns from municipal fac.												.31	
# of Public WW Facilities												1	
# Industrial & Other WW Facilities													
Reclaimed Sewage													

TO: See Distribution
CC:
From: Robert R. Pierce, Hydrologist, Doraville, GA -RRPIERCE)
Date: Thursday, April 04, 1991 08:21:28
Subject: EUOWITUS DOCUMENTATION FORM

E U O W I T U S 1 9 9 0 ***** D O C U M E N T A T I O N

COMPLETE LIST OF SOURCES - [report ALL data received (incl.coefficients) that were used to complete the information for 1990 EUOWITUS]

** 1 **

CATEGORIES OF USE (IN,DO,IR etc): PWS, DO, CO, IN

TYPE (pumpage,acres,coefficient): Pumpage

AGENCY Homer Public Works

CONTACT PERSON Richard Hammer, 235-3170

YEAR OF DATA 1990

ACCURACY Poor

AERIAL EXTENT (site-specific, county, HUC, etc)

FORMAT (printout, publication, verbal communication, etc): Verbal Communications, Summary sheets

---

** 2 **

CATEGORIES OF USE (IN,DO,IR etc):

TYPE (pumpage,acres,coefficient):

AGENCY

CONTACT PERSON

YEAR OF DATA

ACCURACY

AERIAL EXTENT (site-specific, county, HUC, etc)

FORMAT (printout, publication, verbal communication

REPORTED EUOWITUS INFORMATION
- [From the listed sources above please explain how the 'reported' figures for COUNTY, HUC & AQUIFER were derived? In each case referal to any data (incl. coefficients) must come from the "COMPLETE LIST OF SOURCES".

WATER SUPPLY	
WITHDRAWALS	.49
POPULATION SERVED	3,14
NUMBER OF FACILITIES	1
COMMERCIAL	
WITHDRAWALS	.25
DELIVERIES	.20
CONSUMPTIVE USE	.05
DOMESTIC	
WITHDRAWALS	.20
DELIVERIES	.16
CONSUMPTIVE USE	.04

-- INDUSTRIAL --	
WITHDRAWALS	.05
DELIVERIES	.04
CONSUMPTIVE USE	.01
NUMBER OF FACILITIES	3
RECLAIMED WASTEWATER	

-- THERMOELECTRIC --	
WITHDRAWALS	
DELIVERIES	
CONSUMPTIVE USE	
NUMBER OF FACILITES	

-- MINING --	
WITHDRAWALS	
CONSUMPTIVE USE	

-- HYDROELECTRIC --	
TOTAL WATER USE	
POWER GENERATION	
NUMBER OF FACILITIES	

-- LIVESTOCK --	
WITHDRAWALS	
DELIVERIES	
CONSUMPTIVE USE	

-- IRRIGATION --	
WITHDRAWALS AMOUNTS	
CONSUMPTIVE USE	
CONVEYANCE LOSSES	
ACRES IRRIGATED (spray & flood)	
RECLAIMED WASTEWATER	

-- SEWAGE TREATMENT --	
NUMBER OF FACILITES	1
TOTAL WASTE WATER RETURNS	.31
NUMBER OF PUBLIC WASTE WATER FACILITIES	1
NUMBER INDUSTRIAL & OTHER WASTE WATER FACILITIES	
AMOUNT OF WATER RETURNED TO BENEFICIAL USE	

-- RESERVOIR EVAPORATION --	
CONSUMPTIVE USE	
SURFACE AREA	

TO: Distribution list.

Wayne B. Solley, Chief, BWUI, Reston, VA (WBSOLLEY)
David W. Litke, Hydrologist, Lakewood, CO (DWLITKE)
Nancy L. Barber, Hydrologist(Geologist), Jackson, MS (NLBARBER)
Leslie D. Patrick, Hyd (SA), Anchorage, AK (LDPATRICK)

SMTP: Recipient(s) list.

1990 AKWUDS Monthly and Yearly Water-Use Calculations Worksheet

Facility Name: HOMER, CITY OF WATER TREATMENT PLANT

File Type and Number: ADL 57850 Sequence # : 01 T

DATE	DAYS	METER READING	GALLONS	MGD	MONTH
12/31/89	-	-	-	-	-
1/31/90	31	-	10,945,000	0.353065	JAN
2/28/90	28	-	10,469,000	0.373893	FEB
3/31/90	31	-	11,069,000	0.357065	MAR
4/30/90	30	-	14,886,000	0.496200	APR
5/31/90	31	-	20,188,000	0.651226	MAY
6/30/90	30	-	21,694,000	0.723133	JUN
7/31/90	31	-	23,015,000	0.742419	JUL
8/31/90	31	-	18,068,000	0.582839	AUG
9/30/90	30	-	15,023,000	0.500767	SEP
10/31/90	31	-	12,994,000	0.419161	OCT
11/30/90	30	-	11,434,000	0.381133	NOV
12/31/90	31	-	10,523,000	0.339452	DEC
TOTALS:	365	-	180,308,000	0.493995	1990
	MAX:	0.742419	MIN:	0.339452	

1990 METERED HOMER WATER-USE

USE	USE TYPE	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
D	RES. S.F. IN-TOWN	3,429,270	2,732,247	2,942,307	3,245,916	3,228,616	3,703,608	3,898,606	4,164,335	3,408,234
@	RES. M.F. IN-TOWN	1,718,000	1,882,700	1,841,100	1,603,000	1,656,700	1.573.900	1.770.700	1.764.342	1.579.100
M	RES. S.F. OUT-TOWN	37,300	33,500	40,500	50,200	60,200	92,100	81,000	76,000	60,900
.	RES. - SPIT	5,100	5,400	6,500	7,700	5,700	4,900	5,700	5.600	5,200
	COMM. BUSINESS	1,762,800	1,559,000	1,519,958	1,899,708	2,026,254	2.378.200	2,748,400	2,869,000	2,411,300
	COMM. HOTEL/MOTEL	308,100	260,900	248,400	411,600	429,600	524,100	782,400	780,200	644,200
C	COMM. HOSPITALS	293,900	224,200	233,200	305,500	353,800	386,000	369,400	405,200	396,500
O	COMM. CHURCHES	64,700	40,800	51,800	66,100	67,200	121,200	72,700	108,800	82,600
M	COMM. - SPIT	66,100	136,900	117,300	194,200	455,100	862,100	1,204,200	1,137,700	663,400
M	GOV'T - SPIT	242,300	174,900	210,300	207,600	1,463,300	3.061.200	3,956,100	2,196.900	1.716.900
E	CITY - PUB. WORKS	152,800	164,200	141,000	149,100	135,900	145,400	168,400	203,400	185,400
R	CITY - FIRE HALL	19,000	22,000	29,000	20,000	20,000	30.000	16,000	15,000	15,000
C	CITY - POLICE	39,700	22,400	32,700	32,500	35,400	32,400	36,500	45,500	34,000
I	CITY - LIBRARY	7,600	5,000	6,000	8,600	9,100	5,900	8,100	9,500	8,000
A	CITY - MUSEUM	8,800	11,600	7,100	9,300	10,100	21,400	28,800	27,300	18,600
L	CITY - CAMPGROUND	400	400	300	1,200	7,600	35,600	34,600	36,600	38,000
	GOV'T - OTHER	502,300	466,800	480,600	503,900	604,035	955,125	618,900	1,316,300	467,700
	BULK WATER SALES	356,200	332,700	381,700	507.196	688.812	563.279	666.180	706.575	652.365
INDUST.	SPIT - CANNERIES	300,600	861,600	581,700	392,700	3,334,000	4.442.000	1,166,000	1,834,000	791,000
	TOTAL	9,314,970	8,937,247	8,871,465	9,616,020	14,591,407	18.938.412	17,632,686	17,725,052	13,170.599
TOTAL (EXCL. BULK SALES)		8,958,770	8,604,547	8,489,765	9,108,824	13,902,595	18.375.133	16,966,506	17.018.477	12.518.234
TOTAL WATER PRODUCTION		10,945,000	10,469,000	11,069,000	14,886,000	20,188,000	21.534.000	23,015,000	18,068,000	15,023,000
UNACCOUNTABLE USES AND CONVEYANCE LOSSES		1,630,030	1,531,753	2,197,535	5,269,980	5,596,593	2,755,588	5,382,314	342,948	1,852,401
NUMBER OF WATER CUSTOMERS		971	979	982	1,013	1,016	1,022	1,019	1,021	1,023

1990 Sewage Treatment = 112,260,000 gallons
(Spit Canneries discharge into ocean)

OCT	NOV	DEC	TOTAL	GROUP TOTAL (MG)	MGD
2,958,100	3,037,500	2,695,235	39,443,974		108,066 GPD ÷ 678 = 159 g/d/house
1,432,200	1,535,100	1,225,700	19,602,542		53,706 GPD ÷ 105 = 511 g/d/unit
69,000	59,900	52,300	713,700		1,955 GPD ÷ 14 = 140 g/d/house (41.0%)
2,900	2,700	2,100	59,500	59,819,716	.163890 = 163 g/d/house
1,941,276	2,036,400	1,629,919	24,782,215		
383,400	299,184	247,584	5,319,668		
297,300	279,600	253,700	3,798,300		
64,300	95,400	71,900	907,700		
218,600	75,400	66,700	5,197,700		
827,600	480,600	494,300	15,036,000		
123,900	169,800	214,600	1,953,900		
24,000	23,000	28,000	261,000		
17,000	21,000	12,000	351,100		
7,300	7,200	5,200	87,500		
16,300	11,600	7,100	178,000		
7,900	8,500	29,700	200,800		
544,725	574,700	452,300	7,487,375		
419,400	522,100	497,060	6,293,567	71,854,825	.196863 (49.3%)
178,000	151,000	112,000	14,144,600	14,144,600	.038752 (9.7%)
9,533,201	9,390,684	8,097,398	145,819,141	145,819,141	
9,113,801	8,868,584	7,600,338	139,525,574	139,525,574	
12,994,000	11,434,000	10,523,000	180,308,000		.493995
3,460,799	2,043,316	2,425,602	34,488,859		

1,033	1,011	1,006	1,009	AVG. # CUSTOMERS 1990 {WATER, SEWER}
			904	
			976	1988 {WATER, SEWER}
			832	

	SINGLE-FAMILY IN-TOWN	SINGLE-FAMILY OUT-OF-TOWN	MULTI-FAMILY IN-TOWN	SPIT RESIDENTIAL
DEC. '90 # CUSTOMERS	678	14	105	1 (3 in summer)

693 res. × 3 people/res = 2079 peo.

105 a.f. res. × 10 people/a.f. = 1050

2079 + 1050 = 3129 people for all residential use

RESIDENTIAL S.F. = 693 MULTI-FAMILY RESIDENTIAL = 105
TOTAL RESIDENTIAL = 798 (77%) INDUSTRIAL ~ 3 COMM. ~ 208 (21%)

CITY OF HOMER
PUBLIC WORKS

3575 HEATH STREET HOMER, AK 99603

FACSIMILE (907) 235-3145
(907) 235-3170

FACSIMILE COPIER COVER SHEET

CITY OF HOMER
DEPARTMENT OF PUBLIC WORKS
FACSIMILE NO.: (907) 235-3145

ADDRESSEE: DNR / DGGS

ATTENTION OF: BILL PETRIK

ADDRESSEE FAX NO. 696-0078

FROM: RICHARD HAMMER

DATE: 2/13/91 TIME:

NO. OF PAGES TO FOLLOW: 1

IF YOU DO NOT RECEIVE ALL PAGES, PLEASE CALL IMMEDIATELY

(907) 235-3170

COMMENTS:

Evidently this is the only info we have that shows population figures instead of no. of services.

- Must keep in mind that we have more customers connected to water than sewer.

B.11

TABLE IV-3

HOMER WASTEWATER FACILITIES PLAN

ESTIMATED DESIGN LOADINGS
FOR AVERAGE DAY PEAK MONTH CONDITION

	Design Population	Unit Flow (gpcd)(1)	Influent Flow (mgd)(2)	Unit BOD (ppcd)(3)	Influent BOD (ppd)(4)	Unit TSS (pgcd)	Influent TSS (ppd)
1. Homer Sewered Area							
1987	2,480	125	0.31	0.20	496	0.30	744
1997	3,790	125	0.47	0.20	758	0.30	1,137
2007	5,450	125	0.68	0.20	1,090	0.30	1,635
(2) Homer Unsewered Area (except Spit) (septage only)							
1987	1,720	1	0.00	0.02	34	0.04	69
1997	1,620	1	0.00	0.02	32	0.04	65
2007	1,820	1	0.00	0.02	36	0.04	73
3. Homer Spit Sewered Area							
1987	372(6)	125	0.05	0.31	116	0.31	116
1997	492(6)	125	0.06	0.31	154	0.31	154
2007	640(6)	125	0.08	0.31	200	0.31	200
4. Homer Sewered Area Tourist Contribution							
1987	420(7)	65	0.03	0.13	55	0.13	55
1997	570(7)	65	0.04	0.13	74	0.13	74
2007	770(7)	65	0.05	0.13	100	0.13	100
5. Kachemak City Sewered Area (septic tank effluent)							
1987	273	85	0.02	0.13	35	0.08	22
1997	485	85	0.04	0.13	63	0.08	39
2007	650	85	0.06	0.13	85	0.08	52
6. Kachemak City Sewered Area (septage only)(5)							
1987	273	1	0.00	0.02	5	0.04	11
1997	485	1	0.00	0.02	10	0.04	19
2007	650	1	0.00	0.02	13	0.04	26

UTILITY: Kenai Public Works Department

CONTACTS: Jack LaShot, City Engineer, 283-7535

WATER SOURCE

Two wells in the Beaver Creek area supply the public utility. A three million gallon reservoir storage tank exists at the southeast corner of the airport.

WITHDRAWALS

	Gallons
Well 1	137,384,000
Well 2	127,247,000
Total	**264,631,000**

CUSTOMER INFORMATION

Residential	1,195
Commercial	178
Total	**1,373**

FACTS and CALCULATIONS

1) Total water withdrawn:
   264,631,000 gallons per year / 365 days per year = .73 MGD
2) Federal census figures for 1990 indicate a resident population of 6,327. The 1990 state census indicates a population of 6,543.
3) Mr. LaShot supplied Kenai demographics information of an estimated 2.75 people per household in the Kenai area.
4) Estimated population served would then be:
   2.75 people per household X 1,195 residential units = 3,286
   This is roughly 50 percent of the area population.
5) Per capita use:
   .73 MGD / 3,286 capita = 222 gallons per capita per day
6) Mr. LaShot said he thought there were minimal conveyance losses in the water system. An estimate of 10 percent will reduce the withdrawn amount of 264,631,000 gallons by 26,463,100 gallons resulting in a total water delivered estimate of 238,167,900 gallons per year. That is:
   238,167,900 gallons per year / 365 days per year = .65 MGD
7) No breakdown of the percentages of W-U for residential, commercial, and industrial categories were available from the City of Kenai. A breakdown of estimated percentages of respective usage is:

Use Type		%		Gallons		Gallons	MGD
Residential	=	.50	X	238,167,900	=	119,083,950	**.33**
Commercial	=	.40	X	238,167,900	=	95,267,160	**.26**
Industrial	=	.10	X	238,167,900	=	23,816,790	**.07**

8) Average domestic use per day per household:
   119,083,950 gallons / 1,195 households / 365 days per year = 273 gallons

9) Average estimated domestic per capita use:
.33 MGD / 3286 capita = 100 gallons per capita per day

10) No local fossil fuel electric generation occurs in the Kenai area. Electricity is procured through Chugach Electric Association gas turbine station at Beluga, Cooper Lake hydroelectric, or Bradley Lake hydroelectric in the future.

11) No nuclear generation plants in the state of Alaska.

12) The only sewage treatment plant in Kenai discharged 300,516,200 gallons of effluent to Cook Inlet in 1990. Average daily return = 300.5126 MG / 365 days = .82 MGD.

WATER SUPPLY

1) All entries in this category were obtained from the City of Kenai reports.

COMPARISON OF 1985 TO 1990 SUMMARIES

1) The data from the City of Kenai will be aggregated with Homer, Seward, and Soldotna and compared on a separate sheet to the Kenai Peninsula category of the 1985 EUOWITUS.

KENAI

ESTIMATED USE OF WATER IN THE UNITED STATES
1990 - DATA COLLECTION FORM - 1990

7/F/89

COUNTY or HUC NAME _____ COUNTY or HUC CODE _____ TOTAL POPULATION 6.33 (in thousands)

* UNITS IN MGD TO TWO DECIMAL PLACES (UNLESS OTHERWISE SPECIFIED)

	WATER SUPPLY	DOMESTIC	COMMERCIAL	INDUSTRIAL	MINING	FOSSIL FUEL	NUCLEAR	HYDROELECTRIC	LIVESTOCK	ANIMAL SPECIALTIES	IRRIGATION	SEWAGE TRMT.	RESERVOIR EVAP
Total Water Use													
GW Withdrawals - Fresh	.73												
GW Withdrawals - Saline	—												
SW Withdrawals - Fresh	—												
SW Withdrawals - Saline	—												
GW - Population Served (thous.)	3.29												
SW - Population Served (thous.)	—												
Deliveries from Water Supply:		.33	.26	.07		—	—						
Consumptive Use - Fresh													
Consumptive Use - Saline													
Conveyance Loss													
Power Generation (GWh)													
Acres Irrigated - Sprayed (thous.)													
Acres Irrigated - Flooded (thous.)													
Number of Facilities	1												
# Facilities in WU Database	1											1	
WW total returns from municipal fac.												.82	
# of Public WW Facilities												1	
# Industrial & Other WW Facilities												0	
Reclaimed Sewage													

TO: See Distribution
CC:
From: Robert R. Pierce, Hydrologist, Doraville, GA (RRPIERCE)
Date: Thursday, April 04, 1991 08:21:28
Subject: EUOWITUS DOCUMENTATION FORM

E U O W I T U S 1 9 9 0 ***** D O C U M E N T A T I O N

COMPLETE LIST OF SOURCES - (report ALL data received (incl.coefficients) that were used to complete the information for 1990 EUOWITUS)

** 1 **

CATEGORIES OF USE (IN,DO,IR etc): PWS, DO, CO, IN, FP, ST

TYPE (pumpage,acres,coefficient): pumpage

AGENCY KENAI PUBLIC WORKS

CONTACT PERSON JACK LA SHOT

YEAR OF DATA 1990

ACCURACY POOR

AERIAL EXTENT (site-specific, county, HUC, etc) CITY

FORMAT (printout, publication, verbal communication, etc): CITY REPORTS, VERBAL COMMUNICATION

** 2 **

CATEGORIES OF USE (IN,DO,IR etc):

TYPE (pumpage,acres,coefficient):

AGENCY

CONTACT PERSON

YEAR OF DATA

ACCURACY

AERIAL EXTENT (site-specific, county, HUC, etc)

FORMAT (printout, publication, verbal communication

REPORTED EUOWITUS INFORMATION
- (From the listed sources above please explain how the 'reported' figures for COUNTY, HUC & AQUIFER were derived? In each case referal to any data (incl. coefficients) must come from the "COMPLETE LIST OF SOURCES".

-- WATER SUPPLY --	
WITHDRAWALS	.73
POPULATION SERVED	3.29
NUMBER OF FACILITIES	1

-- COMMERCIAL --	
WITHDRAWALS	.29
DELIVERIES	.26
CONSUMPTIVE USE	.03

-- DOMESTIC --	
WITHDRAWALS	.37
DELIVERIES	.33
CONSUMPTIVE USE	.04

-- INDUSTRIAL --	
WITHDRAWALS	.08
DELIVERIES	.07
CONSUMPTIVE USE	.01
NUMBER OF FACILITIES	
RECLAIMED WASTEWATER	

-- THERMOELECTRIC --	
WITHDRAWALS	
DELIVERIES	
CONSUMPTIVE USE	
NUMBER OF FACILITES	

-- MINING --	
WITHDRAWALS	
CONSUMPTIVE USE	

-- HYDROELECTRIC --	
TOTAL WATER USE	
POWER GENERATION	
NUMBER OF FACILITIES	

-- LIVESTOCK --	
WITHDRAWALS	
DELIVERIES	
CONSUMPTIVE USE	

-- IRRIGATION --	
WITHDRAWALS AMOUNTS	
CONSUMPTIVE USE	
CONVEYANCE LOSSES	
ACRES IRRIGATED (spray & flood	
RECLAIMED WASTEWATER	

-- SEWAGE TREATMENT --	
NUMBER OF FACILITES	1
TOTAL WASTE WATER RETURNS	.82
NUMBER OF PUBLIC WASTE WATER FACILITIES	1
NUMBER INDUSTRIAL & OTHER WASTE WATER FACILITIES	
AMOUNT OF WATER RETURNED TO BENEFICIAL USE	

-- RESERVOIR EVAPORATION --	
CONSUMPTIVE USE	
SURFACE AREA	

TO: Distribution list.

Wayne B. Solley, Chief, BWUI, Reston, VA (WBSOLLEY)
David W. Litke, Hydrologist, Lakewood, CO (DWLITKE)
Nancy L. Barber, Hydrologist(Geological, Jackson, MS (NLBARBER)
Leslie D. Patrick, Hyd (SA), Anchorage, AK (LDPATRICK)

SMTP: Recipient(s) list.

1990 AWUDS Monthly and Yearly Water-Use Calculations Worksheet

Facility Name: KENAI, CITY OF WELL #1

File Type and Number: ADL 53282 Sequence # : 01

DATE	DAYS	METER READING	GALLONS	MGD	MONTH
12/31/89	-	-	-	-	-
1/31/90	31	-	11,277,000	0.363774	JAN
2/28/90	28		11,315,000	0.404107	FEB
3/31/90	31	-	11,111,000	0.358419	MAR
4/30/90	30	-	11,315,000	0.377167	APR
5/31/90	31		13,328,000	0.429935	MAY
6/30/90	30	-	12,021,000	0.400700	JUN
7/31/90	31	-	13,330,000	0.430000	JUL
8/31/90	31		11,426,000	0.368548	AUG
9/30/90	30	-	11,313,000	0.377100	SEP
10/31/90	31	-	10,891,000	0.351323	OCT
11/30/90	30		10,217,000	0.340567	NOV
12/31/90	31	-	9,841,000	0.317452	DEC
TOTALS:	365		137,364,000	0.376395	
					1990
MAX:		0.430000	MIN:	0.317452	

1990 AWUDS Monthly and Yearly Water-Use Calculations Worksheet

Facility Name: KENAI, CITY OF WELL #2

File Type and Number: ADL 53282 Sequence # : 02

DATE	DAYS	METER READING	GALLONS	MGD	MONTH
12/31/89	-	-	-	-	-
1/31/90	31	-	8,800,000	0.283871	JAN
2/28/90	28	-	7,412,000	0.264714	FEB
3/31/90	31	-	9,459,000	0.305129	MAR
4/30/90	30	-	7,412,000	0.247067	APR
5/31/90	31	-	13,338,000	0.430258	MAY
6/30/90	30	-	15,885,000	0.529500	JUN
7/31/90	31	-	16,714,000	0.539161	JUL
8/31/90	31	-	9,187,000	0.296355	AUG
9/30/90	30	-	8,260,000	0.275333	SEP
10/31/90	31	-	9,902,000	0.319419	OCT
11/30/90	30	-	9,734,000	0.324467	NOV
12/31/90	31	-	11,144,000	0.359484	DEC
TOTALS:	365	-	127,247,000	0.348622	1990
MAX:		0.539161	MIN:	0.247067	

1990 AWUDS Monthly and Yearly Water-Use Calculations Worksheet

Facility Name: KENAI, CITY OF WASTEWATER TREATMENT PLANT

File Type and Number: LAS 12458 Sequence #: 01 R

DATE	DAYS	METER READING	GALLONS	MGD	MONTH
12/31/89	-	-	-	-	-
1/31/90	31	-	23,591,000	0.761000	JAN
2/28/90	28	-	21,375,200	0.763400	FEB
3/31/90	31	-	27,497,000	0.887000	MAR
4/30/90	30	-	30,000,000	1.000000	APR
5/31/90	31	-	28,861,000	0.931000	MAY
6/30/90	30	-	29,430,000	0.981000	JUN
7/31/90	31	-	28,706,000	0.926000	JUL
8/31/90	31	-	28,024,000	0.904000	AUG
9/30/90	30	-	23,910,000	0.797000	SEP
10/31/90	31	-	19,902,000	0.642000	OCT
11/30/90	30	-	18,450,000	0.615000	NOV
12/31/90	31	-	20,770,000	0.670000	DEC
TOTALS:	365	-	300,516,200	0.823332	
					1990
MAX:		1.000000	MIN:	0.615000	

H. UTILITIES

Utility systems in Kenai are in fair condition and capable of being expanded to meet needs. Water supply and sewage treatment capacity are adequate to serve all areas of the city, although only about half of all residences are now connected to the city systems. Power supply is more than adequate for the foreseeable future from the existing Chugach Electric gas turbine stations at Beluga and near Soldotna, a hydroelectric project at Cooper Landing, and the planned 90 MW Bradley Lake hydroelectric facility near Homer. Power is transmitted via good quality distribution lines to residential and commercial customers in Kenai by Homer Electric Association. Gas service is provided by Enstar Natural Gas.

Telephone Utilities of the Northland provides local telephone service and Cable television is provided by Prime cable. All of the above utilities are regulated by the Alaska Public Utilities Commission.

Water

The Kenai city water system consists of two wells, both in the Beaver Creek area. The combined capacity is approximately 2,600 gpm. There is a 3,000,000 gallon reservoir storage tank at the southeast corner of the airport which significantly increases the storage capacity and fire fighting capability.

The present system serves approximately 1195 residential units and 178 businesses or about 44% of the population. It is anticipated that the existing facility will be adequate through 1995, unless the system is expanded to East Kenai, whereby additional capacity may be needed sooner. Also, new federal surface water treatment rules may require filtration of the existing water supply. This would necessitate major system improvements.

Currently, two personnel operate and maintain the water system and the sewer collection system. Should filtration of the water system be necessary, additional operators will be necessary, and billing rates will be raised accordingly.

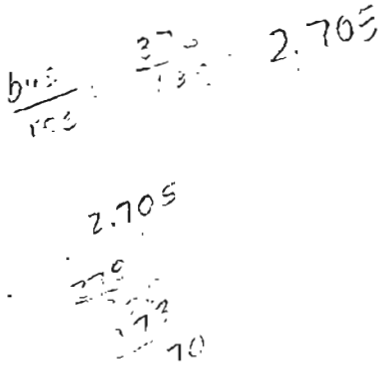
@ 2.75 persons / household = 3,286

1195 res.
178 bus.
1373 total

WATER SERVICE CHARGES

(Approved for 1990-1991)

Residential Water	$166,000	$139 a year per household
Commercial Water	67,000	$376 a year per business
Total	$233,000	



SEWER

Within this service area are ten lift stations and about 25 miles of sewer lines. The City's first treatment system was an Imhoff tank located on the beach below the Old Towne area. In 1972 a newer plant was constructed about 3,000 feet northwest of this site and in 1982 the plant was upgraded and expanded.

The Wildwood sewer system was constructed in the mid-1950's. Wastewater was treated separately at Wildwood until this system was connected with the Kenai system in 1973. Construction of the Kenai sewer system began in 1964. The majority of the system was constructed in the late 1960's and early 1970's. Manhole construction is predominately of concrete, and the older sewer pipe is of asbestos cement construction except for a few relatively short lengths of iron or steel. All sewer pipe installed since about 1981 is ductile iron.

The sewer system as of November 1990 served approximately 1183 residential units and 170 commercial units. The sewer collection system is operated and maintained by two men (shared with the water system). The system serves approximately the same area as the water system with the exception of some areas near the eastern extremity of the City. The wastewater is treated by a secondary treatment plant with a design capacity of 1.3 MGD. An effluent dissinfection facility is planned for construction in 1991. Three plant operators are on the staff at this time. These operators will be able to run the dissinfection system without additional people. Additional operating cost will be generated, however, due to power and other utility costs, chemical supplies, and maintenance. A rate increase may be necessary when this facility comes on line.

The plant operates under the design capacity, at this time. As with the water system, service should be limited to those areas with a moderately high density.

If the municipal sewer system is expanded to East Kenai (Thompson Park, Valhalla Heights, etc.), the existing sewer treatment facility will reach capacity much faster. Expansion of this facility may be needed sooner than projected.

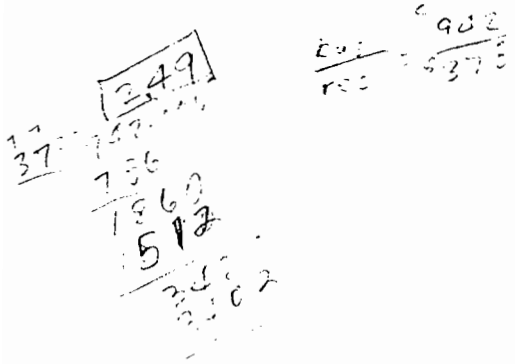
1183 res,
170 bus.
1353

A major problem in the sewer system is peak flows resulting from stormwater entering the sewer system. The removal of sources of stormwater (inflow) or groundwater (infiltration) which was not originally deemed cost effective, may now prove, to be, using present day technology.

The following table depicts service charges for sewer service:

SEWER SERVICE CHARGES

Residential Sewer	$447,000	$378 a year per household
Commercial Sewer	$160,000	$942 a year per business
Total	$607,000	



WATER AND SEWER SYSTEM EXPANSION

One of the most important utilities concern facing Kenai is the need to expand water and sewer services into areas now serviced by on-site systems. Contamination of wells is possible as residential densities increase in these areas. And the lack of water supply threatens firefighting capacity, particularly in the high-value port industrial area.

Between 1977 and 1983, it appears that the percentage of residents served by City water and sewer systems actually decreased, because most development occurred in unserved areas.

Recently, however, City water and sewer service extensions have created greater growth than in unserved rural areas. Areas of the City without water and sewer service include VIP, Beaver Loop, Thompson Park/Valhalla, and mostly undeveloped sections of West Kenai.

Most of the cost for extension of utilities to serve new areas is now paid by the City, often using state grants, with the benefiting residents recently being assessed a small amount. The residents' contribution may increase as state funding for such local improvements, which was generous in the period 1980-84, declines. There is essentially no federal funding from the Environmental Protection Agency at this time.

Given the high cost of trunk sewer and water main extension to neighborhoods distant from existing lines (e.g. Thompson Park/Valhalla is more than one mile from existing sewer lines), the extension of the water system alone might be advocated for health reasons. There could still be ground-water contamination, however, which could have an effect on aquifers and nearby stream quality (e.g. Beaver Creek).

The City has and should continue to develop water and sewer services on a pay-as-you-go basis, depending upon funding from state and local sources as available, and the ability of the benefiting property owners to contribute to improvement costs. The City shall, as funds become available, consider:

a. Establish an equitable and uniform program of levying assessments to property owners to partially fund future water and sewer construction projects.

b. Extend water and sewer service to the high value port area on Bridge Access Road in order to provide fire protection and to facilitate more intense and efficient usage of the port.

c. Seek legislative funding for a sewer main extension to Thompson Park and other improvements.

d. Establish Low Density Residential land uses in areas which may not have water or sewer extended at public expense for at least 15 years, unless funded by the benefiting property owners.

e. Extend sewer and water service to commercial areas and Medium and High Density housing, since distribution lines to Low Density areas are more prone to freezing, and the City maintenance costs are higher.

f. Discourage the installation of independent community water systems in areas not served by City water systems, which - if not designed and installed to City specifications - could later become a maintenance burden to the City if the community system is connected to the City system.

g. Remove sources of stormwater or groundwater from sewer systems.

h. Extend water and sewer systems simutaneously, when feasible, to minimize construction costs.

Water and Sewer Service

The City of Kenai Water and Sewer Fund Revenue approved for 1990-1991 is $950,373.

WATER AND SEWER FUND REVENUE

Water Service	$233,000
Sewer Service	607,000
Penalties and Interest	10,000
Misc. Revenue	2,000
Inspection Fees	1,000
Appropriation of Fund Balance	97,373
Total	$950,373

The approved budget for 1990-1991 is as follows:

WATER AND SEWER BUDGET

Water Division	$264,186
Sewer Division	246,553
Sewer Treatment Division	439,634
Total	$950,373

Corresponding to the water service area, the sewer service area has isolated areas which are not served. They include much of the Beaver Creek and East Kenai neighborhoods.

SOLID WASTE DISPOSAL

The Kenai Peninsula Borough has the responsibility to provide solid waste disposal within the City and Boroughwide. A solid waste transfer site is operated by the Kenai Peninsula Borough and located on Redoubt Avenue. A landfill was located at this site and is now being closed and reclaimed. This transfer site may be relocated in the near future. Collection of solid waste is provided by private collection service.

A hazardous waste site is also being sought by the Borough to replace the Sterling Special Wastes Site, particularly to deal with disposal of petrochemical wastes such as drilling mud. The City has urged the Borough to work with the Alaska Department of Environmental Conservation to develop a hazardous waste disposal plan for the entire Borough.

To provide a permanent solution to the disposal of solid and hazardous waste, the City shall cooperate with the Borough and ADEC to:

a. Reorganize the entire solid waste disposal program on a borough wide basis to better serve the people in an economically and environmentally sound manner.

b. Develop a hazardous waste management plan which includes enforcement of laws against illegal dumping, and development of a hazardous waste disposal site outside the City limits.

Draft 1: 11/21/90
Draft 2: 12/5/90

7. Sewer Service Clean-Out: No person shall install a sewer extension to a building without placing in the line near the building and at every change of direction of the sewer line, a sewer line clean-out of four inch minimum diameter. The property owner shall mark or be familiar with the location of such clean-outs.

8. Rental Properties: In the case of a delinquent water and sewer bill, the property owner shall be held responsible.

B. RATES:

The charges to users of water and sewer systems within the City of Kenai are as follows:

1. SCHEDULE A - GENERAL DOMESTIC SERVICE RATES (NON-METERED)

	Per Month	
	Water	Sewer
One or two-family residence, per family unit	$ 8.50	$ 23.50
Single or double unit apartment, per family unit	$ 8.50	$ 23.50
Apartment, three or more units under one roof, per family unit -- single bill assumed by owner.	$ 6.50	$ 18.00
Separate billing	$ 8.50	$ 23.50
Trailers, one or two on single lot or court (each).	$ 8.50	$ 23.50
Trailers, three or more on lot or court, per trailer unit:		
Single billing	$ 6.50	$ 18.00
Separate billing	$ 8.50	$ 23.50
Boarding houses, per available room	$ 4.25	$ 11.75

Minimum Charge: One month's service.

Special Conditions: The above schedule is restricted to service used exclusively for general domestic purposes, as distinguished from commercial or other uses of water or sewer service.

Garage, service stations	$ 10.45	$ 28.85
Additional charge for recreational vehicle dump stations (May through September only)	$ 12.10	$ 33.40
Hangar, airplane repair:	$ 10.45	$ 28.85
with washing facilities	$ 12.10	$ 33.40
Hospitals, per bed	$ 6.90	$ 19.05
Hotels, motels, resorts, per room	$ 5.35	$ 14.75
Dormitories (sleeping quarters), per bed	$ 2.30	$ 6.35
Laundry, self-service, per machine	$ 9.75	$ 26.90
Markets, meat	$ 13.30	$ 36.70
Office buildings where single bill is assumed by owner, per business	$ 11.50	$ 31.75
Office, in multiple office building where individual tenants are billed, per business	$ 13.30	$ 36.70
Restaurants, cafes, lunch counters, fountains, taverns and bars (with kitchens) for each seat (Note 2)	$ .77	$ 2.13
Public office building, per restroom	$ 3.00	$ 8.30
Recreation facility, per restroom, sauna or shower, etc.	$ 5.80	$ 16.00
Recreational vehicle/camper park, per parking space (demand charge only from October through April)	$ 5.80	$ 16.00
Schools, per seating capacity	$ .35	$ .95
Shopping centers (depends on stores included in shopping center, Note 1)	$ 6.05	$ 16.70
Shops, beauty, per station or chair	$ 6.05	$ 16.70
Shops, miscellaneous (including barber shops), per shop	$ 6.05	$ 16.70
Sleeping room, per room (without facilities for housekeeping)	$ 2.30	$ 6.35

Demand Charge: In addition to the above, the following shall be added where the water connection is larger than 3/4 inch:

1.00 inch service	$ 8.80	$ 24.00
1.25 inch service	$ 13.20	$ 36.00
1.50 inch service	$ 22.00	$ 61.00
2.00 inch service	$ 33.00	$ 91.00
3.00 inch service	$ 50.00	$138.00
Larger than 3.00 inch service	$ 75.00	$207.00

Minimum Charge: One month's service.

4. SCHEDULE D -- FIRE PROTECTION SERVICE

For automatic sprinkler system: NO CHARGE

Special Conditions: (a) Water service under this schedule shall be available, at the option of the City, to "dry type" automatic sprinkler systems for fire protection only.

(b) All fire protection lines, sprinklers, pipes, and valves on private property shall be owned, installed, and maintained by the owner and/or customer.

(c) All connections between the City's main and privately owned facilities will be made at the expense of the customer.

(d) At the option of the City, sprinkler service may be metered. The meter and the installation thereof shall be at the expense of the customer.

(e) No tap or outlet for use other than fire protection shall be permitted on fire lines or mains, unless approved by the City.

(f) In times of emergency, the right is reserved by the City to turn off any fire hydrant and/or sprinkler system at the discretion of the City Fire Chief or other authorized person.

(g) No drains from fire sprinkler systems shall be directly connected with the City sanitary sewers, and no cross-connection whatsoever will be permitted between fire protection facilities connected to the City's system and possible sources of contaminated water.

5. SCHEDULE E -- METERED SERVICE

	Water	Sewer
All usage, per thousand gallons of water	$ 0.85	$ 2.35

Minimum Charge Per Month:

All usage, 15,000 gallons of water	$ 12.75	$ 35.25

CITY: Seward

CONTACTS

1) Everett P. Diener, Manager of Engineering & Utilities, 224-3331
2) Lloyd Welch, Water Operator, 224-5449

WATER SOURCES

1) Fort Raymond Wells - A total of four wells used for the main city area. Wells 1, 2, and 3 are interconnected and use a line-chlorinator. One of the three wells is used almost constantly with the other two used upon demand. Well 4 used intermittently during high peak demand periods, mostly in the summer for fish processing industry. All wells have own chlorinator and each well is metered individually.
2) Marathon Creek - Surface water source south of Seward pumps into the Lowell Canyon Treatment Plant.
3) Seward Marine Industrial Center (SMIC) - Wells "A" and "B" supply all water to this complex located southeast of the Seward city center on the east side of Resurrection Bay. Most water from these sources used for commerce and industry. Only public supply is for the state prison. Wells have control building where they are metered individually and chlorinated. Water pumped as-needed.

WITHDRAWALS

Period of reported withdrawals is 1/2/90 to 1/2/91. Reported withdrawals are as follows:

	Gallons		
SMIC Well A	22,081,000		
SMIC Well B	22,740,000		
Total	**44,821,000**		
Fort Raymond Well #1	205,649,000		
Fort Raymond Well #2	12,073,000		
Fort Raymond Well #3	146,238,900		
Fort Raymond Well #4	45,319,000		
Total	**409,279,900**		
SMIC	44,821,000		
Ft. Ray.	409,279,900		
GW Total:	**454,100,900**	=	**1.24 MGD**
Marathon Creek	137,464,550		
SW Total:	**137,464,550**	=	**.38 MGD**
TOTAL WITHDRAWALS:	**591,565,450**	=	**1.62 MGD**

DELIVERIES

Residential:	271,378,870 gallons		
Commercial:	170,192,835		
Industrial:	111,929,225	=	**.31 MGD**
Total:	553,500,930 gallons		

ADJUSTMENTS to DELIVERIES

Residential Use:	271,378,870		
Prison Use:	+ 10,747,600		
Residential Total:	**282,126,470**	=	**.77 MGD**
Commercial Use including prison:	170,192,835		
Prison Use:	- 10,747,600		
Commercial Total:	**159,445,235**	=	**.44 MGD**

CUSTOMERS SERVED

Residential:	1,459
Commercial:	122
Industrial:	19
Total:	1,600

FACTS and CALCULATIONS

1) Total population for Seward from the federal census = 2,699, including prisoners. From the state census, the population figure = 2,829, including prisoners.
2) The population served was determined by adding the prisoner population to the city population figures that were supplied by Mr. Diener - 412 + 2,240 = **2,652.**
3) The estimated per capita use:
   1.62 MGD / 2,652 capita = **611 gallons per capita per day**
   The estimated domestic per capita use in Seward:
   .77 MGD / 2,652 capita = 290 gallons per capita per day.
   This is high W-U per person but attributable to residences running water during winter to prevent water lines from freezing. The prison, on the other hand:
   10,747,600 gallons per year / 365 days per year / 412 inmates = 71 gallons per inmate per day. This is a figure more consistent with statistical norms.
4) Industrial W-U consists primarily of seafood processing plants.
5) The average single family Seward unit used:
   271,378,870 gallons per year / 1,459 residential customers / 365 days per year = 510 gallons per residence per day.
6) No local fossil fuel generated electrical power stations. Electricity is supplied to Seward from Chugach Electric Association from Bernice Lake, Cooper Lake, Beluga, and Anchorage area powerplants.
7) There are no nuclear power electrical generators in southcentral Alaska.
8) Sewage treatment data collected for two Seward area plants include:

City	214,233,000 gallons		
SMIC	27,872,463		
Total:	**242,105,463** gallons	=	.66 MGD

9) The ratio of total withdrawals to total deliveries is:

553,500,930 gallons / 591,565,450 gallons = .94

Total conveyance losses for the city system were .10 MGD. Mr. Diener was confronted about such small losses. He claims that in his estimation "the water system is pretty tight".

WATER SUPPLY:

1) The surface water and ground water populations served were obtained by a ratio of the total surface water withdrawn to the total water withdrawn and the remaining fraction is groundwater.

137,464,550 / (137,464,550 + 454,100,900) = 137,464,550 / 591,565,450 = .23

Therefore .77 was the groundwater population served ratio. SW population served = .23 X 2,652 = **610**. GW population served = .77 X 2,652 = **2,042**.

COMPARISON OF 1985 TO 1990 SUMMARIES

1) Seward is a located on the Kenai Peninsula. The data for Homer, Kenai, Seward, and Soldotna will be aggregated and compared to the 1985 EUOWITUS under a unique documentation sheet.

SEWARD

ESTIMATED USE OF WATER IN THE UNITED STATES
1990 - DATA COLLECTION FORM - 1990

7/9/89

COUNTY or HUC NAME _____ COUNTY or HUC CODE _____ TOTAL POPULATION 2.70 (in thousands)

* UNITS IN MGD TO TWO DECIMAL PLACES (UNLESS OTHERWISE SPECIFIED)

	WATER SUPPLY	DOMESTIC	COMMERCIAL	INDUSTRIAL	MINING	FOSSIL FUEL	NUCLEAR	HYDROELECTRIC	LIVESTOCK	ANIMAL SPECIALTIES	IRRIGATION	SEWAGE TRMT.	RESERVOIR EVAP
Total Water Use													
GW Withdrawals - Fresh	1.24												
GW Withdrawals - Saline	—												
SW Withdrawals - Fresh	.38												
SW Withdrawals - Saline													
GW - Population Served (thous.)	2.05												
SW - Population Served (thous.)	.61												
Deliveries from Water Supply.		.77	.44	.31		—	—						
Consumptive Use - Fresh													
Consumptive Use - Saline													
Conveyance Loss													
Power Generation (GWh)													
Acres Irrigated - Sprayed (thous.)													
Acres Irrigated - Flooded (thous.)													
Number of Facilities	7												
# Facilities in WU Database	7											2	
WW total returns from municipal fac.												.66	
# of Public WW Facilities												2	
# Industrial & Other WW Facilities													
Reclaimed Sewage													

TO: See Distribution
CC:
From: Robert R. Pierce, Hydrologist, Doraville, GA (RRPIERCE)
Date: Thursday, April 04, 1991 09:21:28
Subject: EUOWITUS DOCUMENTATION FORM

E U O W I T U S 1 9 9 0 ***** D O C U M E N T A T I O N

COMPLETE LIST OF SOURCES - (report ALL data received (incl.coefficients) that were used to complete the information for 1990 EUOWITUS)

** 1 **

CATEGORIES OF USE (IN,DO,IR etc): PWS, DO, CO, IN, ST

TYPE (pumpage,acres,coefficient): Pumpage,

AGENCY Seward, City of

CONTACT PERSON Everett Paul Diener, Lloyd Welch, 224-3331, 5449, resp.

YEAR OF DATA 1990

ACCURACY Poor

AERIAL EXTENT (site-specific, county, HUC, etc) City

FORMAT (printout, publication, verbal communication, etc) Correspondence, verbal communications

---

** 2 **

CATEGORIES OF USE (IN,DO,IR etc):

TYPE (pumpage,acres,coefficient):

AGENCY

CONTACT PERSON

YEAR OF DATA

ACCURACY

AERIAL EXTENT (site-specific, county, HUC, etc)

FORMAT (printout, publication, verbal communication

REPORTED EUOWITUS INFORMATION
- (From the listed sources above please explain how the 'reported' figures for COUNTY, HUC & AQUIFER were derived? In each case referal to any data (incl. coefficients) must come from the 'COMPLETE LIST OF SOURCES'.

-- WATER SUPPLY --	
WITHDRAWALS	1.62 MGD
POPULATION SERVED	2.65
NUMBER OF FACILITIES	7
-- COMMERCIAL --	
WITHDRAWALS	.47
DELIVERIES	.44
CONSUMPTIVE USE	.03
-- DOMESTIC --	
WITHDRAWALS	.82
DELIVERIES	.77
CONSUMPTIVE USE	.05

-- INDUSTRIAL --	
WITHDRAWALS	.33
DELIVERIES	.31
CONSUMPTIVE USE	.02
NUMBER OF FACILITIES	
RECLAIMED WASTEWATER	

-- THERMOELECTRIC --	
WITHDRAWALS	
DELIVERIES	
CONSUMPTIVE USE	
NUMBER OF FACILITES	

-- MINING --	
WITHDRAWALS	
CONSUMPTIVE USE	

-- HYDROELECTRIC --	
TOTAL WATER USE	
POWER GENERATION	
NUMBER OF FACILITIES	

-- LIVESTOCK --	
WITHDRAWALS	
DELIVERIES	
CONSUMPTIVE USE	

-- IRRIGATION --	
WITHDRAWALS AMOUNTS	
CONSUMPTIVE USE	
CONVEYANCE LOSSES	
ACRES IRRIGATED (spray & flood)	
RECLAIMED WASTEWATER	

-- SEWAGE TREATMENT --	
NUMBER OF FACILITES	2
TOTAL WASTE WATER RETURNS	.66
NUMBER OF PUBLIC WASTE WATER FACILITIES	2
NUMBER INDUSTRIAL & OTHER WASTE WATER FACILITIES	
AMOUNT OF WATER RETURNED TO BENEFICIAL USE	

-- RESERVOIR EVAPORATION --	
CONSUMPTIVE USE	
SURFACE AREA	

TO: Distribution list.

Wayne B. Solley, Chief, BWUI, Reston, VA (WBSOLLEY)
David W. Litke, Hydrologist, Lakewood, CO (DWLITKE)
Nancy L. Barber, Hydrologist(Geologist), Jackson, MS (NLBARBER)
Leslie D. Patrick, Hyd (SA), Anchorage, AK (LDPATRICK)

BWIP: Recipient(s) list.

CITY OF SEWARD

P.O. BOX 167
SEWARD, ALASKA 99664

- Main Office (907) 224-3331
- Police (907) 224-3338
- Harbor (907) 224-3138
- Fire (907) 224-3445
- Telecopier (907) 224-3248

February 22, 1991
91-02-123-01

USGS
Attention: Bill Petrick

Reference: Distribution of Water, Seward Water Utility

The total quantity of water from wells or surface runoff distributed by the Seward Water Utility is annually consumed as follows;

Residential Use	-	271,378,870	gallon
Commercial	-	166,328,985	gallon
Industrial(Mostly Fish Processors)	-	111,929,225	gallon
Ship's water	-	3,863,850	gallon
Total Consumption	-	553,500,930	gallon

These figures are approximate, however, they reasonably represent the distribution between major users.

Sincerely,

Everett P. Diener
Manager of Engineering & Utilities

SEWARD

- Loyd Welch talk 2-26 AM.
- Fort Raymond Wells 1-3 interconnected. Use a line-chlorinator. One of the 3 wells is used almost constantly, sometimes more than one. W-H can be based upon immediate demand - not all water pumped is to storage tanks. Metered at wells.
- Fort Raymond Well #4 uses its own chlorinator. This well is intermittantly used during high peak demand periods but mostly in summer for fish processing industry. Metered at wells.
- Marathon Creek pumps into the Lowell Canyon Treatment Plant
- Wells A+B of the Marine Industrial Center supply water for mostly industry & commerce. Only domestic use is for prison. Rest of Seward public water supply used for domestic, commercial, and industrial. Wells A+B have control building with chlorinator & flow meter. Pumped as water is needed.
- Conveyance losses exist but unquantifiable at this time.
- Ship's water mostly used for State Ferry. Other incidental use for barges and other freighters, etc.

EVERETT PAUL DIENER 2-26 AM

412	prison inmates	10,747,600 gallons to prison included in commercial category
2,240	population served	
2,652	TOTAL population served	

(over)

CONNECTIONS

3	Fish Processors	19 Industrial Total
16	Industrial	
122	Commercial	
1459	Residential	
1600	TOTAL	

Ship's water is mostly drinking water = 3,863,850

WITHDRAWALS

	PRO-RATED	REPORTED
SMIC Well A	22,124,246	22,081,000
" " B	22,776,138	22,740,000
SMIC TOTAL	44,900,384	44,821,000

Prison water supplied from SMIC Wells A & B = 10,747,600 gallons
Population = 412 (Dept of Corrections Census)

$\frac{SW}{SW+GW} = \frac{137,464,550}{137,464,550+454,100,900}$

	REPORTED	PRO-RATED
FT. RAYMOND WELL #1	205,649,000	204,162,538
" " " #2	12,073,000	12,073,006
" " " #3	146,238,900	146,247,969
" " " #4	45,319,000	45,342,563
TOTAL	409,279,900	407,826,076

$\frac{SW}{TOTAL\ W} = \frac{137,464,550}{591,565,450} = .23$

$\frac{SW_{POP}}{TOTAL_{POP}} = \frac{SW}{TOTAL\ W} = .23(2652)$

$SW_{POP} = 610$

$GW_{POP} = 2652 - 610 = 2042$

	PRO-RATED	REPORTED
MARATHON CREEK	138,453,836	137,464,550 SW TOTAL

÷365 = .3766 MGD

	REPORTED	PRO-RATED
FT. RAYMOND WELLS	409,279,900	407,826,076
SMIC WELLS	44,821,000	44,900,384
GW TOTAL	454,100,900 (=1.244 MGD)	452,726,460
SW TOTAL	137,464,550	138,453,836
Public Supply TOTAL	591,565,450	591,180,296

3-7-91 Paul Diener attributes high usage of water per person per day to 2 things.
1. Residential water use could not be quantified better at this time
2. High winter W-U to prevent service line freeze-ups.

DELIVERIES

Commercial Use including prison	166,328,985
Prison Use	− 10,747,600
Commercial Use	155,581,385
Ship's Water	3,863,850
New Commercial Total	159,445,235 ÷ 365 DAYS = .4368 MGD

Residential Use	271,378,870
Prison Use	+ 10,747,600
	282,126,470 ÷ 365 DAYS = .7729 MGD

INDUSTRIAL 111,929,225 ÷ 365 DAYS = .3067 MGD

WASTEWATER TREATMENT

City	214,233,000
SMIC	27,872,463
	242,105,463 ÷ 365 DAYS = .6633 MGD

1990 AKWUDS Monthly and Yearly Water-Use Calculations Worksheet

Facility Name: SEWARD, CITY OF FORT RAYMOND #1

File Type and Number: ADL 39336 Sequence Number: 06 W

REPORT DATE	ACTUAL DAYS	MONTH	MONTH DATES	NORMAL DAYS	DAY FACTOR	METER READING	GALLONS	MGD	ADJUSTED GALLONS	NEW GALLONS	ADJUSTED MGD
12/1/89			11/30/89		-1	?	34,000		0		
1/2/90	32	DEC '89	12/31/89	31	2	?	3,215,000	0.100469	(200,938)	3,014,063	0.097228
1/2/90			12/31/89		-2	?			200,938		
2/1/90	30	JAN	1/31/90	31	1	?	1,801,000	0.060033	(60,033)	1,941,904	0.062642
2/1/90			1/31/90		-1	?			60,033		
3/1/90	28	FEB	2/28/90	28	1	?	2,862,000	0.102214	(102,214)	2,819,819	0.100708
3/1/90			2/28/90		-1	?			102,214		
4/2/90	32	MAR	3/31/90	31	2	?	9,333,000	0.291656	(583,313)	8,851,902	0.285545
4/2/90			3/31/90		-2	?			583,313		
5/1/90	29	APR	4/30/90	30	1	?	21,868,000	0.754069	(754,069)	21,697,244	0.723241
5/1/90			4/30/90		-1	?			754,069		
6/1/90	31	MAY	5/31/90	31	1	?	22,347,000	0.720871	(720,871)	22,380,198	0.721942
6/1/90			5/31/90		-1	?			720,871		
7/2/90	31	JUN	6/30/90	30	2	?	1,043,000	0.033645	(67,290)	1,696,581	0.056553
7/2/90			6/30/90		-2	?			67,290		
7/31/90	29	JUL	7/31/90	31	0	?	11,721,000	0.404172	0	11,788,290	0.380267
7/31/90			7/31/90		0	?			0		
9/4/90	35	AUG	8/31/90	31	4	?	30,097,000	0.859914	(3,439,657)	26,657,343	0.859914
9/4/90			8/31/90		-4	?			3,439,657		
10/1/90	27	SEP	9/30/90	30	1	?	24,128,000	0.893630	(893,630)	26,674,028	0.889134
10/1/90			9/30/90		-1	?			893,630		
11/1/90	31	OCT	10/31/90	31	1	?	27,491,000	0.886806	(886,806)	27,487,823	0.887037
11/1/90			10/31/90		-1	?			886,806		
12/3/90	32	NOV	11/30/90	30	3	?	27,647,000	0.863969	(2,591,906)	25,941,900	0.864730
12/3/90			11/30/90		-3	?			2,591,906		
1/2/91	30	DEC	12/31/90	31	2	?	25,311,000	0.843700	(1,687,400)	26,215,506	0.845661
1/2/91			12/31/90		-2	?			1,687,400		
?	0	JAN '91	1/31/91	31	0	?	0	0.000000	0	1,687,400	0.054432
TOTALS:	365	1990		365	0	0	205,649,000	0.563422	(1,486,463) 205,649,000	204,162,538	0.559349
					MAX:	0.889134	MIN:	0.056553	204,162,538	0.559349	

1990 AKWUDS Monthly and Yearly Water-Use Calculations Worksheet

Facility Name: SEWARD, CITY OF FORT RAYMOND #2

File Type and Number: ADL 39936 Sequence Number: 02 W

REPORT DATE	ACTUAL DAYS	MONTH	MONTH DATES	NORMAL DAYS	DAY FACTOR	METER READING	GALLONS	MGD	ADJUSTED GALLONS	NEW GALLONS	ADJUSTED MGD
12/1/89			11/30/89		-1	?	1,190,200		0		
1/2/90	32	DEC '89	12/31/89	31	2	?	100	0.000003	(6)	94	0.000003
1/2/90			12/31/89		-2	?			6		
2/1/90	30	JAN	1/31/90	31	1	?	2,200	0.000073	(73)	3,133	0.000069
2/1/90			1/31/90		-1	?			73		
3/1/90	28	FEB	2/28/90	28	1	?	0	0.000000	0	73	0.000003
3/1/90			2/28/90		-1	?			0		
4/2/90	32	MAR	3/31/90	31	2	?	0	0.000000	0	0	0.000000
4/2/90			3/31/90		-2	?			0		
5/1/90	29	APR	4/30/90	30	1	?	0	0.000000	0	0	0.000000
5/1/90			4/30/90		-1	?			0		
6/1/90	31	MAY	5/31/90	31	1	?	0	0.000000	0	0	0.000000
6/1/90			5/31/90		-1	?			0		
7/2/90	31	JUN	6/30/90	30	2	?	0	0.000000	0	0	0.000000
7/2/90			6/30/90		-2	?			0		
7/31/90	29	JUL	7/31/90	31	0	?	0	0.000000	0	0	0.000000
7/31/90			7/31/90		0	?			0		
9/4/90	35	AUG	8/31/90	31	4	?	10,307,800	0.300223	(1,200,391)	9,306,909	0.300223
9/4/90			8/31/90		-4	?			1,200,691		
10/1/90	27	SEP	9/30/90	30	1	?	1,161,300	0.043011	(43,011)	2,319,180	0.07730
10/1/90			9/30/90		-1	?			43,011		
11/1/90	31	OCT	10/31/90	31	1	?	0	0.000000	0	43,011	0.0013
11/1/90			10/31/90		-1	?			0		
12/3/90	32	NOV	11/30/90	30	3	?	401,700	0.012533	(37,353)	364,041	0.0121
12/3/90			11/30/90		-3	?			37,353		
1/2/91	30	DEC	12/31/90	31	2	?	0	0.000000	0	37,653	0.001
1/2/91			12/31/90		-2	?			0		
?	0	JAN '91	1/31/91	31	0	?	0	0.000000	0	0	0.000
TOTALS:	365			365	0	0	12,073,000	0.033077	6	12,073,006	0.033
		1990							12,073,000		
					MAX:	0.300223	MIN:	0.000000	12,073,006	0.033077	

1990 AKWUDS Monthly and Yearly Water-Use Calculations Worksheet

Facility Name: SEWARD, CITY OF — FORT RAYMOND #3

File Type and Number: ADL 39936 — Sequence Number: 03 W

REPORT DATE	ACTUAL DAYS	MONTH	MONTH DATES	NORMAL DAYS	DAY FACTOR	METER READING		GALLONS	MGD	ADJUSTED GALLONS	NEW GALLONS	ADJUSTED MGD
12/1/89			11/30/89		-1	?		6,821,000		0		
1/2/90	32	DEC '89	12/31/89	31	2	?		145,100	0.004534	(9,069)	136,031	0.004388
1/2/90			12/31/89		-2	?				9,069		
2/1/90	30	JAN	1/31/90	31	1	?		5,559,400	0.185313	(185,313)	5,383,155	0.173650
2/1/90			1/31/90		-1	?				185,313		
3/1/90	28	FEB	2/28/90	28	1	?		19,629,000	0.701036	(701,036)	19,113,278	0.682617
3/1/90			2/28/90		-1	?				701,036		
4/2/90	32	MAR	3/31/90	31	2	?		22,848,900	0.714028	(1,428,056)	22,121,879	0.713609
4/2/90			3/31/90		-2	?				1,428,056		
5/1/90	29	APR	4/30/90	30	1	?		20,834,400	0.718083	(718,083)	21,534,373	0.717812
5/1/90			4/30/90		-1	?				718,083		
6/1/90	31	MAY	5/31/90	31	1	?		17,465,400	0.563400	(563,400)	17,620,083	0.568390
6/1/90			5/31/90		-1	?				563,400		
7/2/90	31	JUN	6/30/90	30	2	?		14,611,100	0.471326	(942,652)	14,231,848	0.474395
7/2/90			6/30/90		-2	?				942,652		
7/31/90	29	JUL	7/31/90	31	0	?		19,152,000	0.660414	0	20,094,652	0.648015
7/31/90			7/31/90		0	?				0		
9/4/90	35	AUG	8/31/90	31	4	?		18,463,900	0.527540	(2,110,160)	16,353,740	0.527540
9/4/90			8/31/90		-4	?				2,110,160		
10/1/90	27	SEP	9/30/90	30	1	?		2,001,600	0.074133	(74,133)	4,037,627	0.134588
10/1/90			9/30/90		-1	?				74,133		
11/1/90	31	OCT	10/31/90	31	1	?		570,700	0.018410	(13,410)	626,424	0.020207
11/1/90			10/31/90		-1	?				13,410		
12/3/90	32	NOV	11/30/90	30	3	?		5,112,500	0.159766	(479,297)	4,651,613	0.155054
12/3/90			11/30/90		-3	?				479,297		
1/2/91	30	DEC	12/31/90	31	2	?		0	0.000000	0	479,297	0.015461
1/2/91			12/31/90		-2	?				0		
^	0	JAN '91	1/31/91	31	0	?		0	0.000000	0	0	0.000000
TOTALS:	365			365	0		0	146,238,900	0.400655	9,069	146,247,969	0.400679
		1990								146,238,900		
					MAX:	0.717812		MIN:	0.015461	146,247,969	0.400679	

1990 AKWUDS Monthly and Yearly Water-Use Calculations Worksheet

Facility Name: SEWARD, CITY OF — FORT RAYMOND #4

File Type and Number: ADL 39936 — Sequence Number: 04 W

REPORT DATE	ACTUAL DAYS	MONTH	MONTH DATES	NORMAL DAYS	DAY FACTOR	METER READING	GALLONS	MGD	ADJUSTED GALLONS	NEW GALLONS	ADJUSTED MGD
12/1/89			11/30/89		-1	?	0		0		
1/2/90	32	DEC '89	12/31/89	31	2	?	377,000	0.011781	(23,563)	353,438	0.011401
1/2/90			12/31/89		-2	?			23,563		
2/1/90	30	JAN	1/31/90	31	1	?	5,450,000	0.181667	(181,667)	5,291,896	0.170706
2/1/90			1/31/90		-1	?			181,667		
3/1/90	28	FEB	2/28/90	28	1	?	251,000	0.008964	(8,964)	423,702	0.015132
3/1/90			2/28/90		-1	?			8,964		
4/2/90	32	MAR	3/31/90	31	2	?	0	0.000000	0	8,964	0.000280
4/2/90			3/31/90		-2	?			0		
5/1/90	29	APR	4/30/90	30	1	?	3,117,000	0.107483	(107,483)	3,009,517	0.100317
5/1/90			4/30/90		-1	?			107,483		
6/1/90	31	MAY	5/31/90	31	1	?	3,468,000	0.111871	(111,871)	3,463,612	0.111729
6/1/90			5/31/90		-1	?			111,871		
7/2/90	31	JUN	6/30/90	30	2	?	754,000	0.024323	(48,545)	817,226	0.027241
7/2/90			6/30/90		-2	?			48,545		
7/31/90	29	JUL	7/31/90	31	0	?	15,489,000	0.534103	0	15,537,545	0.501214
7/31/90			7/31/90		0	?			0		
9/4/90	35	AUG	8/31/90	31	4	?	16,698,000	0.477086	(1,908,343)	14,789,657	0.477086
9/4/90			8/31/90		-4	?			1,908,343		
10/1/90	27	SEP	9/30/90	30	1	?	0	0.000000	0	1,908,343	0.063611
10/1/90			9/30/90		-1	?			0		
11/1/90	31	OCT	10/31/90	31	1	?	0	0.000000	0	0	0.000000
11/1/90			10/31/90		-1	?			0		
12/3/90	32	NOV	11/30/90	30	3	?	92,000	0.002875	(5,525)	83,375	0.002779
12/3/90			11/30/90		-3	?			5,525		
1/2/91	30	DEC	12/31/90	31	2	?	0	0.000000	0	8,625	0.000278
1/2/91			12/31/90		-2	?			0		
?	0	JAN '91	1/31/91	31	0	?	0	0.000000	0	0	0.000000
TOTALS:	365			365	0	0	45,319,000	0.124162	23,563	45,342,563	0.124226
		1990							45,319,000		
					MAX:	0.501214		MIN:	0.000000	45,342,563	0.124226

1990 AKWUDS Monthly and Yearly Water-Use Calculations Worksheet

Facility Name: SEWARD, CITY OF MARATHON CREEK

File Type and Number: ADL 210826 Sequence Number: 01 W

REPORT DATE	ACTUAL DAYS	MONTH	MONTH DATES	NORMAL DAYS	DAY FACTOR	METER READING	GALLONS	MGD	ADJUSTED GALLONS	NEW GALLONS	ADJUSTED MGD
12/1/89			11/30/89		-1	?	28,206,100		0		
1/2/90	32	DEC '89	12/31/89	31	2	?	30,116,900	0.941153	(1,882,306)	28,234,594	0.910793
1/2/90			12/31/89		-2	?			1,882,306		
2/1/90	30	JAN	1/31/90	31	1	?	20,751,000	0.691700	(691,700)	21,941,606	0.707794
2/1/90			1/31/90		-1	?			691,700		
3/1/90	28	FEB	2/28/90	28	1	?	14,858,900	0.502104	(502,104)	14,248,496	0.508875
3/1/90			2/28/90		-1	?			502,104		
4/2/90	32	MAR	3/31/90	31	2	?	10,804,500	0.337641	(675,281)	10,631,322	0.342945
4/2/90			3/31/90		-2	?			675,281		
5/1/90	29	APR	4/30/90	30	1	?	14,950,700	0.515541	(515,541)	15,110,440	0.503681
5/1/90			4/30/90		-1	?			515,541		
6/1/90	31	MAY	5/31/90	31	1	?	9,491,700	0.306184	(306,184)	9,701,058	0.312937
6/1/90			5/31/90		-1	?			306,184		
7/2/90	31	JUN	6/30/90	30	2	?	29,142,200	0.940071	(1,860,142)	27,568,242	0.918941
7/2/90			6/30/90		-2	?			1,860,142		
7/31/90	29	JUL	7/31/90	31	0	?	11,187,000	0.385759	0	13,067,142	0.450591
7/31/90			7/31/90		0	?			0		
9/4/90	35	AUG	8/31/90	31	4	?	7,499,900	0.214283	(857,131)	6,642,769	0.214283
9/4/90			8/31/90		-4	?			857,131		
10/1/90	27	SEP	9/30/90	30	1	?	450	0.000017	(17)	857,565	0.028585
10/1/90			9/30/90		-1	?			17		
11/1/90	31	OCT	10/31/90	31	1	?	0	0.000000	0	17	0.000001
11/1/90			10/31/90		-1	?			0		
12/3/90	32	NOV	11/30/90	30	3	?	6,182,900	0.193216	(573,547)	5,603,253	0.186775
12/3/90			11/30/90		-3	?			573,547		
1/2/91	30	DEC	12/31/90	31	2	?	13,395,300	0.446510	(893,020)	13,081,927	0.421998
1/2/91			12/31/90		-2	?			893,020		
?	0	JAN '91	1/31/91	31	0	?	0	0.000000	0	893,020	0.028807
TOTALS:	365			365	0	0	137,464,550	0.376615	969,286	136,453,836	0.379328
		1990							137,464,550		
					MAX:	0.918941	MIN:	0.000001	136,453,836	0.379328	

1990 AKWUDS Monthly and Yearly Water-Use Calculations Worksheet

Facility Name: SEWARD, CITY OF MARINE INDUSTRIAL CENTER WELL A

File Type and Number: LAS 11311 Sequence Number: 01 W

REPORT DATE	ACTUAL DAYS	MONTH	MONTH DATES	NORMAL DAYS	DAY FACTOR	METER READING	GALLONS	MGD	ADJUSTED GALLONS	NEW GALLONS	ADJUSTED MGD
12/1/89			11/30/89		-1	?	1,473,000		0		
1/2/90	32	DEC '89	12/31/89	31	2	?	2,149,000	0.067156	(134,313)	2,014,688	0.064990
1/2/90			12/31/89		-2	?			134,313		
2/1/90	30	JAN	1/31/90	31	1	?	1,408,000	0.046933	(46,933)	1,495,379	0.048238
2/1/90			1/31/90		-1	?			46,933		
3/1/90	28	FEB	2/28/90	28	1	?	1,553,000	0.055464	(55,464)	1,544,469	0.055160
3/1/90			2/28/90		-1	?			55,464		
4/2/90	32	MAR	3/31/90	31	2	?	1,447,000	0.045219	(90,438)	1,412,027	0.045549
4/2/90			3/31/90		-2	?			90,436		
5/1/90	29	APR	4/30/90	30	1	?	1,684,000	0.058069	(58,069)	1,716,369	0.057212
5/1/90			4/30/90		-1	?			58,069		
6/1/90	31	MAY	5/31/90	31	1	?	2,493,000	0.080419	(80,419)	2,470,650	0.079698
6/1/90			5/31/90		-1	?			80,419		
7/2/90	31	JUN	6/30/90	30	2	?	1,867,000	0.060226	(120,452)	1,826,968	0.060899
7/2/90			6/30/90		-2	?			120,452		
7/31/90	29	JUL	7/31/90	31	0	?	2,582,000	0.089034	0	2,702,452	0.087175
7/31/90			7/31/90		0	?			0		
9/4/90	35	AUG	8/31/90	31	4	?	3,436,000	0.098171	(392,586)	3,043,314	0.098171
9/4/90			8/31/90		-4	?			392,586		
10/1/90	27	SEP	9/30/90	30	1	?	1,565,000	0.057963	(57,963)	1,899,723	0.063324
10/1/90			9/30/90		-1	?			57,963		
11/1/90	31	OCT	10/31/90	31	1	?	1,289,000	0.041581	(41,581)	1,305,382	0.042109
11/1/90			10/31/90		-1	?			41,581		
12/3/90	32	NOV	11/30/90	30	3	?	1,391,000	0.043469	(130,406)	1,302,174	0.043406
12/3/90			11/30/90		-3	?			130,406		
1/2/91	30	DEC	12/31/90	31	2	?	1,366,000	0.045533	(91,067)	1,405,340	0.045334
1/2/91			12/31/90		-2	?			91,067		
?	0	JAN '91	1/31/91	31	0	?	0	0.000000	0	91,067	0.002938
TOTALS:	365			365	0	0	22,081,000	0.060496	43,246	22,124,246	0.060614
		1990							22,081,000		
					MAX:	0.098171	MIN:	0.042109	22,124,246	0.060614	

1990 AKWUDS Monthly and Yearly Water-Use Calculations Worksheet

Facility Name: SEWARD, CITY OF MARINE INDUSTRIAL CENTER WELL 8

File Type and Number: LAS 11311 Sequence Number: 02 W

REPORT DATE	ACTUAL DAYS	MONTH	MONTH DATES	NORMAL DAYS	DAY FACTOR	METER READING	GALLONS	MGD	ADJUSTED GALLONS	NEW GALLONS	ADJUSTED MGD
12/1/89			11/30/89		-1	?	1,464,000		0		
1/2/90	32	DEC '89	12/31/89	31	2	?	2,111,000	0.065969	(131,938)	1,979,063	0.063841
1/2/90			12/31/89		-2	?			131,936		
2/1/90	30	JAN	1/31/90	31	1	?	1,188,000	0.039600	(39,600)	1,280,339	0.041301
2/1/90			1/31/90		-1	?			39,600		
3/1/90	28	FEB	2/28/90	28	1	?	1,722,000	0.061500	(61,500)	1,700,100	0.060718
3/1/90			2/28/90		-1	?			61,500		
4/2/90	32	MAR	3/31/90	31	2	?	3,864,000	0.120750	(241,500)	3,684,000	0.115938
4/2/90			3/31/90		-2	?			241,500		
5/1/90	29	APR	4/30/90	30	1	?	1,658,000	0.057172	(57,172)	1,842,328	0.061411
5/1/90			4/30/90		-1	?			57,172		
6/1/90	31	MAY	5/31/90	31	1	?	2,465,000	0.079516	(79,516)	2,442,656	0.078795
6/1/90			5/31/90		-1	?			79,516		
7/2/90	31	JUN	6/30/90	30	2	?	1,937,000	0.062484	(124,968)	1,991,548	0.063052
7/2/90			6/30/90		-2	?			124,968		
7/31/90	29	JUL	7/31/90	31	0	?	2,487,000	0.085759	0	2,611,968	0.090257
7/31/90			7/31/90		0	?			0		
9/4/90	35	AUG	8/31/90	31	4	?	1,772,000	0.050629	(202,514)	1,569,486	0.050629
9/4/90			8/31/90		-4	?			202,514		
10/1/90	27	SEP	9/30/90	30	1	?	1,489,000	0.055148	(55,148)	1,636,366	0.054545
10/1/90			9/30/90		-1	?			55,148		
11/1/90	31	OCT	10/31/90	31	1	?	1,392,000	0.044581	(44,581)	1,392,568	0.044922
11/1/90			10/31/90		-1	?			44,581		
12/3/90	32	NOV	11/30/90	30	3	?	1,339,000	0.041844	(125,531)	1,259,049	0.041935
12/3/90			11/30/90		-3	?			125,531		
1/2/91	30	DEC	12/31/90	31	2	?	1,437,000	0.047900	(95,800)	1,466,731	0.047314
1/2/91			12/31/90		-2	?			95,800		
?	0	JAN '91	1/31/91	31	0	?	0	0.000000	0	95,800	0.003090
TOTALS:	365			365	0	0	32,740,000	0.062301	36,138	32,776,138	0.062400
		1990							32,740,000		
					MAX:	0.116839	MIN:	0.041301	32,776,138	0.062400	

1990 AKWUDS Monthly and Yearly Water-Use Calculations Worksheet

Facility Name: SEWARD, CITY OF LOWELL POINT WASTEWATER TREATMENT PLANT

File Type and Number: LAS 1921 Sequence Number: 01 R

REPORT DATE	ACTUAL DAYS	MONTH	MONTH DATES	NORMAL DAYS	DAY FACTOR	METER READING	GALLONS	MGD	ADJUSTED GALLONS	NEW GALLONS	ADJUSTED MGD
11/30/89			11/30/89		0	?	28,050,000		0		
12/31/89	31	DEC '89	12/31/89	31	0	?	22,630,000	0.730000	0	22,630,000	0.730000
12/31/89			12/31/89		0	?			0		
2/1/90	32	JAN	1/31/90	31	1	?	19,275,000	0.602344	(602,344)	18,672,656	0.602344
2/1/90			1/31/90		-1	?			602,344		
3/1/90	28	FEB	2/28/90	28	1	?	16,117,000	0.575607	(575,607)	16,143,737	0.576562
3/1/90			2/28/90		-1	?			575,607		
4/2/90	32	MAR	3/31/90	31	2	?	23,885,000	0.746406	(1,492,813)	22,967,795	0.740897
4/2/90			3/31/90		-2	?			1,492,813		
5/1/90	29	APR	4/30/90	30	1	?	17,845,000	0.615345	(615,345)	18,722,468	0.624082
5/1/90			4/30/90		-1	?			615,345		
6/4/90	34	MAY	5/31/90	31	4	?	19,788,000	0.582000	(2,328,000)	18,975,345	0.583076
6/4/90			5/31/90		-4	?			2,328,000		
7/2/90	28	JUN	6/30/90	30	2	?	15,425,000	0.550893	(1,101,786)	16,651,214	0.555040
7/2/90			6/30/90		-2	?			1,101,786		
7/31/90	29	JUL	7/31/90	31	0	?	17,120,000	0.590345	0	18,221,786	0.587300
7/31/90			7/31/90		0	?			0		
9/4/90	35	AUG	8/31/90	31	4	?	17,900,000	0.511429	(2,045,714)	15,854,286	0.511429
9/4/90			8/31/90		-4	?			2,045,714		
10/1/90	27	SEP	9/30/90	30	1	?	21,267,000	0.787667	(787,667)	22,525,048	0.750835
10/1/90			9/30/90		-1	?			787,667		
11/1/90	31	OCT	10/31/90	31	1	?	18,089,000	0.583516	(583,516)	18,293,151	0.590102
11/1/90			10/31/90		-1	?			583,516		
12/3/90	32	NOV	11/30/90	30	3	?	13,872,000	0.433500	(1,300,500)	13,155,016	0.438501
12/3/90			11/30/90		-3	?			1,300,500		
1/2/91	30	DEC	12/31/90	31	2	?	14,625,000	0.487500	(975,000)	14,950,500	0.482274
1/2/91			12/31/90		-2	?			975,000		
?	0	JAN '91	1/31/91	31	0	?	0	0.000000	0	975,000	0.031452
TOTALS:	367	1990		365	2		0 215,206,000	0.586338	(975,000) 215,206,000	214,233,000	0.586340
					MAX:	0.750835	MIN:	0.436501	214,233,000	0.586340	

1990 AKWUDS Monthly and Yearly Water-Use Calculations Worksheet

Facility Name: SEWARD, CITY OF MARINE INDUSTRIAL CENTER

File Type and Number: LAS 11301 Sequence Number: 01 R

REPORT DATE	ACTUAL DAYS	MONTH	MONTH DATES	NORMAL DAYS	DAY FACTOR	METER READING	GALLONS	MGD	ADJUSTED GALLONS	NEW GALLONS	ADJUSTED MGD
12/1/89			11/30/89		-1	?	1,672,528		0		
12/31/89	30	DEC '89	12/31/89	31	0	?	2,211,360	0.073712	0	2,211,360	0.071334
12/31/89			12/31/89		0	?			0		
2/1/90	32	JAN	1/31/90	31	1	?	2,078,028	0.064938	(64,938)	2,013,090	0.064938
2/1/90			1/31/90		-1	?			64,938		
3/1/90	28	FEB	2/28/90	28	1	?	1,754,454	0.062659	(62,659)	1,756,733	0.062740
3/1/90			2/28/90		-1	?			62,659		
4/2/90	32	MAR	3/31/90	31	2	?	3,294,276	0.102946	(205,392)	3,151,043	0.101647
4/2/90			3/31/90		-2	?			205,392		
5/1/90	29	APR	4/30/90	30	1	?	3,318,666	0.114437	(114,437)	3,410,121	0.113671
5/1/90			4/30/90		-1	?			114,437		
6/4/90	34	MAY	5/31/90	31	4	?	1,957,704	0.057580	(230,318)	1,841,823	0.059414
6/4/90			5/31/90		-4	?			230,318		
7/2/90	28	JUN	6/30/90	30	2	?	1,941,444	0.069337	(138,575)	2,033,088	0.067770
7/2/90			6/30/90		-2	?			138,575		
7/31/90	29	JUL	7/31/90	31	0	?	1,855,266	0.063975	0	1,993,941	0.064321
7/31/90			7/31/90		0	?			0		
9/4/90	35	AUG	8/31/90	31	4	?	2,074,776	0.059279	(237,117)	1,837,659	0.059279
9/4/90			8/31/90		-4	?			237,117		
10/1/90	27	SEP	9/30/90	30	1	?	2,294,279	0.084973	(84,973)	2,446,423	0.081547
10/1/90			9/30/90		-1	?			84,973		
11/1/90	31	OCT	10/31/90	31	1	?	1,814,616	0.058536	(58,536)	1,841,053	0.059389
11/1/90			10/31/90		-1	?			58,536		
12/3/90	32	NOV	11/30/90	30	3	?	2,136,576	0.066768	(200,304)	1,994,808	0.066494
12/3/90			11/30/90		-3	?			200,304		
1/2/91	30	DEC	12/31/90	31	2	?	3,591,834	0.119728	(239,456)	3,552,682	0.114603
1/2/91			12/31/90		-2	?			239,456		
?	0	JAN '91	1/31/91	31	0	?	0	0.000000	0	239,456	0.007724
TOTALS:	367			365	2	0	28,111,919	0.076593	(239,456)	27,872,463	0.076363
		1990							28,111,919		
					MAX:	0.114603	MIN:	0.059279	27,872,463	0.076363	

CITY: Soldotna - Public Works Department

CONTACTS: Dave Bunnell, Public Works Director, 262-9107

WATER SOURCES

Five wells labelled A through E are used as public supply for the City of Soldotna. They are located in various places throughout the city. Wells A through E have treatment facilities at them. Water is generally used upon demand from wells. Excess treated water is stored in a large tank and the amount of storage does not reflect total W-U. In addition, four more wells are used as public supply during the tourist season two each at Centennial and Swiftwater campgrounds.

WITHDRAWALS

	Gallons		Yearly Pro-Rated Gallons
Well A	2,031,740		3,482,983
Well B	87,797,000		91,298,875
Well C	114,799,400		114,799,400
Well D	0		0
Well E	125,830		125,830
Centennial	600,000	Est.	600,000
Swiftwater	600,000	Est.	600,000
Total	**205,953,970**		**210,907,088**

CUSTOMER INFORMATION

Residential	Customers	Units
Single-Family	703	703
Multi-Family	67	413
Trailer Courts	4	94
Sub-Total / Total	**774**	**1,210**

Commercial	Customers
Government	15
Churches	13
Restaurants	8
Hotel/Motel	8
Bars	3
Misc. Businesses	99
Sub-Total	**146**

Total	**920**	**1,210**

FACTS and CALCULATIONS

1) Total estimated water withdrawn:
   210,907,088 gallons per year / 365 days per year = .58 MGD
2) Federal census figures for 1990 indicate a resident population of 6,327. The 1990 state census indicates a population of 6,543.

3) Mr. Bunnell supplied Soldotna demographics information estimating 2.68 people per household in the Soldotna area.

4) Estimated population served would then be:

2.68 people per household X 1,210 residential units = **3,243**

This is roughly 50 percent of the area population.

5) The city engineer said he thought there were minimal conveyance losses in the water system. An estimate of 10 percent conveyance losses will reduce the withdrawn amount of 210,907,088 gallons by 21,090,709 gallons resulting in a total water delivered estimate of 189,816,379 gallons per year. That is:

189,816,379 gallons per year / 365 days per year = **.52 MGD**

6) No breakdown of the percentages of W-U for residential, commercial, and industrial categories were available from the City of Soldotna. A breakdown of estimated percentages of respective usage is:

Use Type		%		Gallons		Gallons	MGD
Residential	=	.46	X	189,816,379	=	87,315,534	**.24**
Commercial	=	.44	X	189,816,379	=	83,519,207	**.23**
Industrial	=	.10	X	189,816,379	=	18,981,638	**.05**

7) Average domestic use per day per household = 87,315,534 gallons / 1,210 households / 365 days per year = 198 gallons

8) The average estimated per capita use:

.58 MGD / 3,243 capita = **179 gallons per capita per day**

The average estimated domestic per capita use per day:

.24 MGD / 3,243 capita = 74 gallons per capita per day

9) No local fossil fuel electric generation occurs in the Soldotna area. Electricity is procured through Chugach Electric Association gas turbine station at Beluga, Cooper Lake hydroelectric, or Bradley Lake hydroelectric in the future.

10) No nuclear generation plants in the state of Alaska.

11) The only sewage treatment plant in Soldotna discharged 203,735,000 gallons of effluent to the Kenai River in 1990. Average daily return = 203.735 MG / 365 days = **.56 MGD.**

WATER SUPPLY

1) All entries in this category were obtained from the City of Soldotna reports.

COMPARISON OF 1985 TO 1990 SUMMARIES

1) The data from the City of Soldotna will be aggregated with Homer, Kenai, and Seward, and compared on a separate sheet to the Kenai Peninsula category of the 1985 EUOWITUS.

SOLDOTNA

ESTIMATED USE OF WATER IN THE UNITED STATES
1990 – DATA COLLECTION FORM – 1990

68/6/2

COUNTY or HUC NAME _____ COUNTY or HUC CODE _____ TOTAL POPULATION (in thousands) 3.48

* UNITS IN MGD TO TWO DECIMAL PLACES (UNLESS OTHERWISE SPECIFIED)

	WATER SUPPLY	DOMESTIC	COMMERCIAL	INDUSTRIAL	MINING	FOSSIL FUEL	NUCLEAR	HYDROELECTRIC	LIVESTOCK	ANIMAL SPECIALTIES	IRRIGATION	SEWAGE TRMT.	RESERVOIR EVAP
Total Water Use													
GW Withdrawals – Fresh	.58												
GW Withdrawals – Saline	—												
SW Withdrawals – Fresh	—												
SW Withdrawals – Saline	—												
GW – Population Served (thous.)	3.24												
SW – Population Served (thous.)	—												
Deliveries from Water Supply:		.24	.23	.05		—	—						
Consumptive Use – Fresh													
Consumptive Use – Saline													
Conveyance Loss													
Power Generation (GWh)													
Acres Irrigated – Sprayed (thous.)													
Acres Irrigated – Flooded (thous.)													
Number of Facilities	7												
# Facilities in WU Database	7											1	
WW total returns from municipal fac.												.56	
# of Public WW Facilities												1	
# Industrial & Other WW Facilities												?	
Reclaimed Sewage													

TO: See Distribution
CC:
From: Robert R. Pierce, Hydrologist, Doraville, GA (RRPIERCE)
Date: Thursday, April 04, 1991 08:21:28
Subject: EUCWITUS DOCUMENTATION FORM

E U O W I T U S 1 9 9 0 ***** D O C U M E N T A T I O N

COMPLETE LIST OF SOURCES - (report ALL data received (incl.coefficients) that were used to complete the information for 1990 EUCWITUS)

** 1 **

CATEGORIES OF USE (IN,DO,IR etc): PWS, DO, CO, IN, FP, ST

TYPE (pumpage,acres,coefficient): Pumpage

AGENCY SOLDOTNA, CITY OF

CONTACT PERSON Dave Bunnell

YEAR OF DATA 1990

ACCURACY POOR

AERIAL EXTENT (site-specific, county, HUC, etc) city

FORMAT (printout, publication, verbal communication, etc) monthly reports, verbal communication

---

** 2 **

CATEGORIES OF USE (IN,DO,IR etc):

TYPE (pumpage,acres,coefficient):

AGENCY

CONTACT PERSON

YEAR OF DATA

ACCURACY

AERIAL EXTENT (site-specific, county, HUC, etc)

FORMAT (printout, publication, verbal communication

REPORTED EUCWITUS INFORMATION
- (From the listed sources above please explain how the 'reported' figures for COUNTY, HUC & AQUIFER were derived? In each case referal to any data (incl. coefficients) must come from the "COMPLETE LIST OF SOURCES".

-- WATER SUPPLY --

WITHDRAWALS	.58
POPULATION SERVED	3.24
NUMBER OF FACILITIES	7

-- COMMERCIAL --

WITHDRAWALS	.25
DELIVERIES	.23
CONSUMPTIVE USE	.02

-- DOMESTIC --

WITHDRAWALS	.27
DELIVERIES	.24
CONSUMPTIVE USE	.03

-- INDUSTRIAL --	
WITHDRAWALS	.06
DELIVERIES	.05
CONSUMPTIVE USE	.01
NUMBER OF FACILITIES	
RECLAIMED WASTEWATER	

-- THERMOELECTRIC --	
WITHDRAWALS	
DELIVERIES	
CONSUMPTIVE USE	
NUMBER OF FACILITES	

-- MINING --	
WITHDRAWALS	
CONSUMPTIVE USE	

-- HYDROELECTRIC --	
TOTAL WATER USE	
POWER GENERATION	
NUMBER OF FACILITIES	

-- LIVESTOCK --	
WITHDRAWALS	
DELIVERIES	
CONSUMPTIVE USE	

-- IRRIGATION --	
WITHDRAWALS AMOUNTS	
CONSUMPTIVE USE	
CONVEYANCE LOSSES	
ACRES IRRIGATED (spray & flood)	
RECLAIMED WASTEWATER	

-- SEWAGE TREATMENT --	
NUMBER OF FACILITES	1
TOTAL WASTE WATER RETURNS	.56
NUMBER OF PUBLIC WASTE WATER FACILITIES	1
NUMBER INDUSTRIAL & OTHER WASTE WATER FACILITIES	
AMOUNT OF WATER RETURNED TO BENEFICIAL USE	

-- RESERVOIR EVAPORATION --	
CONSUMPTIVE USE	
SURFACE AREA	

TO: Distribution list.

Wayne B. Solley, Chief, BWUI, Reston, VA (WBSOLLEY)
David W. Litke, Hydrologist, Lakewood, CO (DWLITKE)
Nancy L. Barber, Hydrologist(Geologist), Jackson, MS (NLBARBER)
Leslie D. Patrick, Hyd (SA), Anchorage, AK (LDPATRIC)

SMTP: Recipient(s) list.

SOLDOTNA 1990 EUOWITUS 2-26-91

- Dave Burnell, Public Works Director
- all wells have treatment facilities at them
- Water is used directly from these treatment facilities and the surplus pumped to a storage tank. Use of water from storage tank is not reflective of total water use.
- No population served values available 3,733 residents shown in area. Many are not on public water or sewer.
- Most public water use returns to the water table. Discharge from Wastewater Treatment facility is 1/30 the total amount withdrawn.
- 4 more wells are public supply. 2 at Centennialand 2 at Swiftwater Campgrounds Est. W-U is 10,000 gal/day for tourist seasons, i.e. from May 15 - Sept 15. (4 months) Therefore, avg. yearly W-U for these wells is 3,333 gal/day
- Conveyance losses
- Water Uses identified under Soldotna Sewer Master Plan

TYPE	SERVICES	UNITS
RESIDENTIAL:		
Single-Family	703	703
Multi-Family	67	413
Trailer Courts	4	94
CHURCHES	13	
GOV'T	15	
BAR	3	
RESTAURANTS	8	
HOTEL/MOTEL	8	
MISC. BUSINESSES	99	
	920	1210

EST. OF POP. SERVED: 1210 UNITS x 2.68 PEOPLE/UNIT
= 3,243 PEOPLE

1990 AKWUDS Monthly and Yearly Water-Use Calculations Worksheet

Facility Name: SOLDOTNA, CITY OF WELL A

File Type and Number: ADL 56342 Sequence # : 01

DATE	DAYS	METER READING	GALLONS	MGD	MONTH
12/31/89	-	-	-	-	-
1/31/90	31	-	139,420	0.004497	JAN
2/28/90	28		34,620	0.001236	FEB
3/31/90	31	-	322,080	0.010390	MAR
4/30/90	30	-	850,000	0.028333	APR
5/31/90	31		383,120	0.012359	MAY
6/30/90	30	-	302,500	0.010083	JUN
7/31/90	0	-	0	0.000000	JUL
8/31/90	0		NA	0.000000	AUG
9/30/90	0	-	NA	0.000000	SEP
10/31/90	0	-	NA	0.000000	OCT
11/30/90	0		NA	0.000000	NOV
12/31/90	0	-	NA	0.000000	DEC
TOTALS:	181		2,031,740	0.011225	
					1990
MAX:		0.028333	MIN:	0.000000	

1990 AKWUDS Monthly and Yearly Water-Use Calculations Worksheet

Facility Name: SOLDOTNA, CITY OF WELL B

File Type and Number: ADL 40315 Sequence # : 01

DATE	DAYS	METER READING	GALLONS	MGD	MONTH
12/31/89	-	-	-	-	-
1/31/90	31	-	7,516,000	0.242452	JAN
2/28/90	28	-	7,379,000	0.263536	FEB
3/31/90	31	-	8,262,000	0.266516	MAR
4/30/90	30	-	8,138,000	0.271267	APR
5/31/90	31	-	7,991,000	0.257774	MAY
6/30/90	30	-	7,787,000	0.259567	JUN
7/31/90	31	-	9,047,000	0.291839	JUL
8/31/90	31	-	8,519,000	0.274806	AUG
9/30/90	30	-	5,881,000	0.196033	SEP
10/31/90	31	-	6,884,000	0.222065	OCT
11/30/90	30	-	7,167,000	0.238900	NOV
12/17/90	17	-	3,226,000	0.189765	DEC
TOTALS:	351		87,797,000	0.250134	1990
MAX:		0.291839	MIN:	0.189765	

1990 AKWUDS Monthly and Yearly Water-Use Calculations Worksheet

Facility Name: SOLDOTNA, CITY OF WELL C

File Type and Number: ADL 206983 Sequence # : 01

DATE	DAYS	METER READING	GALLONS	MGD	MONTH
12/31/89	-	-	-	-	-
1/31/90	31	-	15,138,100	0.490261	JAN
2/28/90	28	-	12,757,200	0.455614	FEB
3/31/90	31	-	12,886,800	0.415703	MAR
4/30/90	30	-	9,449,300	0.314977	APR
5/31/90	31	-	10,835,000	0.351452	MAY
6/30/90	30	-	13,014,600	0.433820	JUN
7/31/90	31	-	10,257,900	0.330900	JUL
8/31/90	31	-	7,176,900	0.231513	AUG
9/30/90	30	-	5,026,600	0.167553	SEP
10/31/90	31	-	5,188,700	0.167377	OCT
11/30/90	30	-	4,969,100	0.165637	NOV
12/31/90	31	-	7,979,200	0.257394	DEC
TOTALS:	365	-	114,799,400	0.314519	1990
MAX:		0.490261	MIN:	0.165637	

1990 AKWUDS Monthly and Yearly Water-Use Calculations Worksheet

Facility Name: SOLDOTNA, CITY OF WELL D PUBLIC SUPPLY

File Type and Number: ADL 214896 Sequence # : 01

DATE	DAYS	METER READING	GALLONS	MGD	MONTH
12/31/89	-	-	-	-	-
1/31/90	0	-	0	0.000000	JAN
2/28/90	0	-	0	0.000000	FEB
3/31/90	0	-	0	0.000000	MAR
4/30/90	0	-	0	0.000000	APR
5/31/90	0	-	0	0.000000	MAY
6/30/90	0	-	0	0.000000	JUN
7/31/90	0	-	0	0.000000	JUL
8/31/90	0	-	0	0.000000	AUG
9/30/90	0	-	0	0.000000	SEP
10/31/90	0	-	0	0.000000	OCT
11/30/90	0	-	0	0.000000	NOV
12/31/90	0	-	0	0.000000	DEC
TOTALS:	0		0	ERR	1990

MAX: 0.000000 MIN: 0.000000

1990 AWUDS Monthly and Yearly Water-Use Calculations Worksheet

Facility Name: SOLDOTNA, CITY OF WELL E

File Type and Number: LAS 11215 Sequence #: 01

DATE	DAYS	METER READING	GALLONS	MGD	MONTH
12/31/89	-	-	-	-	-
1/31/90	31	-	16,930	0.000546	JAN
2/28/90	28	-	20,320	0.000726	FEB
3/31/90	31	-	16,400	0.000529	MAR
4/30/30	30	-	19,750	0.000658	APR
5/31/90	31	-	6,090	0.000196	MAY
6/30/90	30	-	3,810	0.000127	JUN
7/31/90	31	-	5,210	0.000168	JUL
8/31/90	31	-	14,520	0.000468	AUG
9/30/90	30	-	5,040	0.000168	SEP
10/31/90	31	-	5,200	0.000168	OCT
11/30/90	30	-	6,340	0.000211	NOV
12/31/90	31	-	6,220	0.000201	DEC
TOTALS:	365		125,830	0.000345	1990

MAX: 0.000726 MIN: 0.000127

1990 AKWUDS Monthly and Yearly Water-Use Calculations Worksheet

Facility Name: SOLDOTNA, CITY OF WASTEWATER TREATMENT PLANT

File Type and Number: LAS 12463 Sequence # : 01 R

DATE	DAYS	METER READING	GALLONS	MGD	MONTH
12/31/89	-	-	-	-	-
1/31/90	31	-	14,880,000	0.480000	JAN
2/28/90	28	-	15,176,000	0.542000	FEB
3/31/90	31	-	20,181,000	0.651000	MAR
4/30/90	30	-	18,450,000	0.615000	APR
5/31/90	31		15,810,000	0.510000	MAY
6/30/90	30	-	15,510,000	0.517000	JUN
7/31/90	31	-	18,253,000	0.589000	JUL
8/31/90	31		17,856,000	0.576000	AUG
9/30/90	30	-	16,830,000	0.561000	SEP
10/31/90	31	-	16,306,000	0.526000	OCT
11/30/90	30		16,590,000	0.553000	NOV
12/31/90	31	-	17,887,000	0.577000	DEC
TOTALS:	365		203,735,000	0.558178	
					1990
MAX:		0.651000	MIN:	0.480000	

CITY: Nome - Nome Joint Utilities (NJU)

CONTACTS: Robert Russell, Water/Sewer Operator, 443-5058

WATER SOURCE: Moonlight Springs

WATER UTILITY BACKGROUND

Information obtained from Bob Russell and from personal experience of the author will describe the Nome water system. A buried infiltration gallery collects moonlight springs water, a main water source for this area for hundreds of years. From a water vault, flow either goes through a pipe toward town or through an overflow to an adjacent pond. The chlorination/fluoridation system is located in a building within a quarter mile of the vault.

The piping system for the utility has been upgraded within the past few years and Bob Russell contends that conveyance losses are minimal. The order in which water is withdrawn from the water supply line is the same as the listing in the "1990 WATER-USE" section which follows.

The NJU has an indoor reservoir housed with a power generation system. The reservoir water is used as coolant for the power generation system through a closed circulation heat exchange system. All reservoir water passes through this closed system and no water is consumed during the power generation phase. From the reservoir, water is released to city area customers.

CUSTOMERS SERVED

(see 9 of "FACTS and CALCULATIONS")

Domestic	1987		1990 Projected
Residential	714	X 1.07 =	764
Trucked	139	X 1.07 =	149
Subtotal	**853**		**913**
Commercial	105	X 1.07 =	112
Total	**958**		**1,025**

1990 WITHDRAWALS

User	Gallons	Use Type
Beltz High School	3,497,595	Comm.
Anvil Mountain Correctional Facility	3,175,290	Dom.
National Guard Hanger	91,250	Comm.
Federal Aviation Administration Housing	1,993,387	Dom.
City of Nome	169,871,913	
Multi.		
TOTAL	178,629,435	

Total Withdrawals = 178,629,435 gallons per year / 365 days per year = .49 MGD

DELIVERIES

Except in the case of the city, all deliveries are estimated to be the same amount as withdrawals because delivery points are where water is withdrawn and metered. W-U points are very short distances from delivery points. In the case of the city, a 10 percent conveyance loss is assumed from the city reservoir to delivery points. Total conveyance losses for the city then are :

.10 X 169,871,913 gallons per year = 16,987,191 gallons per year

Therefore, total deliveries to the City of Nome are:

169,871,913 gallons per year - 16,987,191 gallons per year = 152,884,722 gallons per year

Total deliveries for the Nome area:

178,629,435 gallons per year - 16,987,191 gallons per year = 161,642,244 gallons per year = 161,642,244 gallons per year / 365 days per year = **.44 MGD**

FACTS and CALCULATIONS

1) W-U data from NJU supplied to DNR. All W-U data from NJU except the National Guard Hanger, based on mid-monthly meter readings pro-rated to a full month basis. The National Guard Hanger W-U is estimated based on random meter readings.

2) Domestic deliveries for the City of Nome were estimated at 53 percent of total estimated city deliveries:

.53 X 152,884,722 gallons = 81,028,903 gallons.

Add to this the withdrawals for Anvil Mountain Correctional Facility and FAA Housing (which are assumed to have negligible conveyance losses because of withdrawal at point of delivery):

City of Nome	81,028,903	gallons
Anvil Mt. Corr. Facility	3,175,290	
FAA Housing	91,250	
Total Domestic Deliveries	**84,295,443**	**gallons**

84,295,443 gallons per year / 365 days per year = **.23 MGD**

A 10 percent conveyance loss between the city reservoir and customers is estimated:

.10 X 81,028,903 gallons per year = 8,102,890 gallons per year / 365 days per year = **.02 MGD**

3) Commercial deliveries for the City of Nome are estimated at 37 percent of total estimated city deliveries:

.37 X 152,884,722 gallons = 56,567,347 gallons.

Add to this the withdrawals for Beltz High School and the National Guard Hanger (which are assumed to have negligible conveyance losses because of withdrawal at point of delivery):

City of Nome	56,567,347	gallons
Beltz High School	3,497,595	
National Guard Hanger	91,250	
Total Commercial deliveries	**60,156,192**	**gallons per year**

60,156,192 gallons per year / 365 days per year = **.16 MGD**

4) NJU claims virtually no industrial W-U. Examination of the Standard Industrial Classification codes for industrial W-U indicates that industrial W-U does actually occur in Nome. An estimate of 10 percent of the City of Nome W-U was made for industrial W-U for Nome:

.10 X 152,884,722 gallons per year = 15,288,472 gallons per year / 365 days per year = **.04 MGD**

Other industrial W-U in the area is mining but is self-supplied.

5) All water withdrawn by the city is considered to be used non-consumptively for fossil fuel generation:

169,871,913 gallons per year / 365 days per year = .47 MGD

6) The number of water customers was obtained from Bob Russell of the NJU.

7) The number of people/household, projected in 1997, was obtained from "Water and Sewer Master Plan, City of Nome, Alaska, August 1976" by CH2M Hill. This number is 3.4.

8) Federal census figure for Nome are 3,500. This includes the prison population of 102. The state census figure for Nome, including prisoners, is 4,503. The federal census figure, 3,500, will be used in related estimations.

9) The number of customers served was not available for 1990. The last year that data was available was 1987. The method of projecting the 1990 number of customers served as listed in "CUSTOMERS SERVED" above assumes that the number of customers served grows proportionately to the population:

	'90 population	3,500	895 people / 14 years =
less	'76 population	2,605	63.93 people per year
	14 years	895	

63.93 people per year / 2,605 people = .025 per year

1990 - 1987 = 3 years 3 years X .025 per year = .074

10) From the "Water and Sewer Master Plan", the projected 1997 number of persons per household is 3.4. This number will be used because the author does not think that it changes much relative to time. Therefore, the population served is a product of the number of people per household and the number of residences or customers served: 3.4 X 913 = 3,104

11) Average estimated per capita use:

.49 MGD / 3,104 capita = 158 gallons per capita per day

The average estimated domestic per capita use per day is:

.23 MGD / 3,104 capita = 74 gallons per person per day.

A check on the domestic per capita use estimate is the Anvil Mt. Correctional Facility:

3,175,290 gallons per year / 365 days per year / 102 people = 85 gallons per person per day.

12) The Nome sewage treatment plant discharged 101,930,400 gallons of effluent into the mouth of the Snake River. That is equivalent to .28 MGD.

WATER SUPPLY:

1) All entries in this category were obtained from NJU except the number of facilities in W-U database. The AKWUDS program had data from one public treatment facility.

COMPARISON OF 1985 TO 1990 SUMMARIES

1) Total Population - the 1985 reported federal census statistics for the Nome census area was 8,000. The reported 1990 federal census for the same area is 8,288. This report only considered the City of Nome but the reported federal population difference is within the 10 percent margin of error.

2) The 1985 EUOWITUS examined the entire Nome census area. This summary only examined the City of Nome. There will be no more comparisons of 1985 to 1990 data.

NOME

ESTIMATED USE OF WATER IN THE UNITED STATES
1990 – DATA COLLECTION FORM – 1990

68/9/2

COUNTY or HUC NAME _____ COUNTY or HUC CODE _____ TOTAL POPULATION _____
(in thousands)

* UNITS IN MGD TO TWO DECIMAL PLACES (UNLESS OTHERWISE SPECIFIED)

	WATER SUPPLY	DOMESTIC	COMMERCIAL	INDUSTRIAL	MINING	FOSSIL FUEL	NUCLEAR	HYDROELECTRIC	LIVESTOCK	ANIMAL SPECIALTIES	IRRIGATION	SEWAGE TRMT.	RESERVOIR EVAP
Total Water Use													
GW Withdrawals – Fresh	.49												
GW Withdrawals – Saline	—												
SW Withdrawals – Fresh	—												
SW Withdrawals – Saline	—												
GW – Population Served (thous.)	3.10												
SW – Population Served (thous.)	—												
Deliveries from Water Supply:		.23	.16	.04		.47	0						
Consumptive Use – Fresh						0	0						
Consumptive Use – Saline						0	0						
Conveyance Loss													
Power Generation (GWh)													
Acres Irrigated – Sprayed (thous.)													
Acres Irrigated – Flooded (thous.)													
Number of Facilities	1					1	0	0					
# Facilities in WU Database	1					1	0	0				1	
WW total returns from municipal fac.												.28	
# of Public WW Facilities												1	
# Industrial & Other WW Facilities													
Reclaimed Sewage													

TO: See Distribution
CC:
From: Robert R. Pierce, Hydrologist, Doraville, GA (RRPIERCE)
Date: Thursday, April 04, 1991 08:21:28
Subject: EUOWITUS DOCUMENTATION FORM

E U O W I T U S 1 9 9 0 ***** D O C U M E N T A T I O N

COMPLETE LIST OF SOURCES - (report ALL data received (incl.coefficients) that were used to complete the information for 1990 EUOWITUS)

** 1 **

CATEGORIES OF USE (IN,DO,IR etc): PWS, DO, CO, IN, ST, FP

TYPE (pumpage,acres,coefficient): pumpage

AGENCY Nome - Nome Joint Utilities

CONTACT PERSON Robert Russell 443-5058

YEAR OF DATA 1990

ACCURACY POOR

AERIAL EXTENT (site-specific, county, HUC, etc) Nome

FORMAT (printout, publication, verbal communication, etc) Monthly reports, verbal communications

---

** 2 **

CATEGORIES OF USE (IN,DO,IR etc):

TYPE (pumpage,acres,coefficient):

AGENCY

CONTACT PERSON

YEAR OF DATA

ACCURACY

AERIAL EXTENT (site-specific, county, HUC, etc)

FORMAT (printout, publication, verbal communication

REPORTED EUOWITUS INFORMATION
- (From the listed sources above please explain how the 'reported' figures for COUNTY, HUC & AQUIFER were derived? In each case referal to any data (incl. coefficients) must come from the 'COMPLETE LIST OF SOURCES".

-- WATER SUPPLY --	
WITHDRAWALS	.49
POPULATION SERVED	3.11
NUMBER OF FACILITIES	1

-- COMMERCIAL --	
WITHDRAWALS	.18
DELIVERIES	.16
CONSUMPTIVE USE	.02

-- DOMESTIC --	
WITHDRAWALS	.26
DELIVERIES	.23
CONSUMPTIVE USE	.02

-- INDUSTRIAL --	
WITHDRAWALS	.05
DELIVERIES	.04
CONSUMPTIVE USE	<.01
NUMBER OF FACILITIES	
RECLAIMED WASTEWATER	

-- THERMOELECTRIC --	
WITHDRAWALS	
DELIVERIES	
CONSUMPTIVE USE	
NUMBER OF FACILITES	

-- MINING --	
WITHDRAWALS	
CONSUMPTIVE USE	

-- HYDROELECTRIC --	
TOTAL WATER USE	
POWER GENERATION	
NUMBER OF FACILITIES	

-- LIVESTOCK --	
WITHDRAWALS	
DELIVERIES	
CONSUMPTIVE USE	

-- IRRIGATION --	
WITHDRAWALS AMOUNTS	
CONSUMPTIVE USE	
CONVEYANCE LOSSES	
ACRES IRRIGATED (spray & flood)	
RECLAIMED WASTEWATER	

-- SEWAGE TREATMENT --	
NUMBER OF FACILITES	1
TOTAL WASTE WATER RETURNS	.28
NUMBER OF PUBLIC WASTE WATER FACILITIES	1
NUMBER INDUSTRIAL & OTHER WASTE WATER FACILITIES	
AMOUNT OF WATER RETURNED TO BENEFICIAL USE	

-- RESERVOIR EVAPORATION --	
CONSUMPTIVE USE	
SURFACE AREA	

TO: Distribution list.

Wayne B. Solley, Chief, BWUI, Reston, VA (WBSOLLEY)
David W. Litke, Hydrologist, Lakewood, CO (DWLITKE)
Nancy L. Barber, Hydrologist(Geologist), Jackson, MS (NLBARBER)
Leslie D. Patrick, Hyd (SA), Albuquerque, NM (LDPATRIC)

SMTP: Recipient(s) list.

NOME

FACTS FROM CH_2M HILL, WATER & SEWER MASTER PLAN, CITY OF NOME, ALASKA, AUGUST 1976

- '76 POPULATION = 2605 , 1990 POP. = 4503 , 1997 proj. pop = 5000, AT CURRENT RATE '76 to '90 , '97 pop. ≅ 5452
- '76 pop. served = 1303 , also 1400± mentioned, est. '90 pop served = 2252
- 67 gpcd in '76, '97 proj = 80 gpcd
- 354 connections and 420 not connected in '76, proj. connections in '97 = 396 out of 420
- '97 proj. connections = 396
- '97 proj. 3.4 persons/housing unit

Anvil Mtn. Correctional Facility Population = 102

	1990 W-U	Pro-rated Gallons	MGD
R	Anvil Mtn. Prison	3,175,290	.008699
C	Beltz High School	3,497,595	.009582
R	FAA Housing	1,993,387	.005461
	Nat'l Guard Hanger	91,250	.000250
I	City of Nome	169,871,913	.465403

From graphical extrapolation estimates:

City of Nome W-U Residential Use = 52.6%
Commercial Use = 37.4%
Industrial Use = 10.%

MOONLIGHT SPRINGS AVG. YEARLY OVERFLOW 2.35 CFS = 1.52 MGD

WATER CUSTOMERS SEPT. '87 (From Bob Russell)

RESIDENTIAL	714
TRUCKED	139
COMMERCIAL	105
	958

PROJECTED WATER CUSTOMERS 1990

RESIDENTIAL	784
TRUCKED	153
COMMERCIAL	115
	1052

3-28-91 Conversation w/ Bob Russell

Power Sources: @ Nome Joint Utilities - public
@ Alaska Gold - private, public emergency BU.
@ Snake River Plant - diesel

38,745,962 AVG BTU/DAY exchanged daily over years time

Main water line to reservoir goes through heat exchanger before reservoir then a different sealed heat exchange system piped around reservoir. Some amount of water used on reservoir.

Est. Total Pop. 2821 served

RESIDENTIAL CUSTOMERS SERVED = 784 + 153 = 937
Pop. served est. = 937 × 3.4

3186 / 2252 / 6438 ÷ 2 = 2719 + 102 inmates + 1821 = 3186 vs. 2252

1990 AWUDS Monthly and Yearly Water-Use Calculations Worksheet

Facility Name: NOME JOINT UTILITY ANVIL MOUNTAIN CORRECTIONAL FACILITY

File Type and Number: ADL 42993 Sequence Number: 02 W

REPORT DATE	ACTUAL DAYS	MONTH	MONTH DATES	NORMAL DAYS	DAY FACTOR	METER READING	GALLONS	MGD	ADJUSTED GALLONS	NEW GALLONS	ADJUSTED MGD
11/16/89			11/30/89		14	12,465,000			(94,367)		
12/16/89	30	DEC '89	12/31/89	31	-15	12,667,000	202,000	0.006733	113,710	221,443	0.007145
12/16/89			12/31/89		15	12,667,000			(113,710)		
1/16/90	31	JAN	1/31/90	31	-15	12,902,000	235,000	0.007581	137,419	259,710	0.008345
1/16/90			1/31/90		15	12,902,000			(137,419)		
2/16/90	31	FEB	2/28/90	28	-12	13,186,000	284,000	0.009161	99,429	246,009	0.008786
2/16/90			2/28/90		12	13,186,000			(99,429)		
3/16/90	28	MAR	3/31/90	31	-15	13,418,000	232,000	0.008286	115,545	248,217	0.008007
3/16/90			3/31/90		15	13,418,000			(115,545)		
4/16/90	31	APR	4/30/90	30	-14	13,657,000	239,000	0.007710	111,533	234,988	0.007830
4/16/90			4/30/90		14	13,657,000			(111,533)		
5/16/90	30	MAY	5/31/90	31	-15	13,896,000	239,000	0.007967	122,419	249,886	0.008061
5/16/90			5/31/90		15	13,896,000			(122,419)		
6/16/90	31	JUN	6/30/90	30	-14	14,149,000	253,000	0.008161	109,567	240,247	0.008008
6/16/90			6/30/90		14	14,149,000			(109,567)		
7/16/90	30	JUL	7/31/90	31	-15	14,384,000	235,000	0.007833	124,539	250,172	0.008070
7/16/90			7/31/90		15	14,384,000			(124,539)		
8/16/90	31	AUG	8/31/90	31	-15	14,642,000	259,000	0.008323	114,000	247,161	0.007973
8/31/90			8/31/90		0	14,642,000			0		
9/30/90	30	SEP	9/30/90	30	0	?	228,000	0.007600	0	228,000	0.007600
9/30/90			9/30/90		0 ?				0		
10/31/90	31	OCT	10/31/90	31	0	?	253,000	0.008161	0	253,000	0.008161
10/31/90			10/31/90		0 ?				0		
11/30/90	30	NOV	11/30/90	30	0	?	325,000	0.010833	0	325,000	0.010833
11/30/90			11/30/90		0 ?				0		
12/31/90	31	DEC	12/31/90	31	0	?	394,000	0.012710	0	394,000	0.012710
12/31/90			12/31/90		0 ?				0		
1/16/91	16	JAN '91	1/31/91	31	-15	?	0	0.000000	0	0	0.000000
TOTALS:	365			365	0	(12,667,000)	3,175,000	0.006693	290	3,175,290	0.008693
		1990							3,175,000		
					MAX:	0.012710	MIN:	0.007600	3,175,290	0.008693	

1990 AWUDS Monthly and Yearly Water-Use Calculations Worksheet

Facility Name: NOME JOINT UTILITY BELTZ HIGH SCHOOL

File Type and Number: ADL 42993 Sequence Number: 03 W

REPORT DATE	ACTUAL DAYS	MONTH	MONTH DATES	NORMAL DAYS	DAY FACTOR	METER READING	GALLONS	MGD	ADJUSTED GALLONS	NEW GALLONS	ADJUSTED MGD
11/16/89			11/30/89		14	11,046,600			(113,187)		
12/16/89	30	DEC '89	12/31/89	31	-15	11,287,000	240,400	0.008013	104,355	233,068	0.007518
12/16/89			12/31/89		15	11,287,000			(104,355)		
1/16/90	31	JAN	1/31/90	31	-15	11,503,700	216,700	0.006990	135,355	348,200	0.008006
1/16/90			1/31/90		15	11,503,700			(135,355)		
2/16/90	31	FEB	2/28/90	28	-12	11,785,500	281,800	0.009090	120,771	266,217	0.009508
2/16/90			2/28/90		12	11,785,500			(120,771)		
3/16/90	28	MAR	3/31/90	31	-15	12,067,300	281,800	0.010064	100,548	361,577	0.008433
3/16/90			3/31/90		15	12,067,300			(100,548)		
4/16/90	31	APR	4/30/90	30	-14	12,275,100	207,800	0.006703	120,773	228,025	0.007601
4/16/90			4/30/90		14	12,275,100			(120,773)		
5/16/90	30	MAY	5/31/90	31	-15	12,533,900	258,800	0.008627	123,484	261,511	0.008435
5/16/90			5/31/90		15	12,533,900			(123,484)		
6/16/90	31	JUN	6/30/90	30	-14	12,789,100	255,200	0.008232	98,187	229,903	0.007663
6/16/90			6/30/90		14	12,789,100			(98,187)		
7/16/90	30	JUL	7/31/90	31	-15	12,999,500	210,400	0.007013	135,242	247,455	0.007982
7/16/90			7/31/90		15	12,999,500			(135,242)		
8/16/90	31	AUG	8/31/90	31	-15	13,279,000	279,500	0.009016	150,550	294,808	0.009510
8/31/90			8/31/90		0	13,279,000			0		
9/30/90	30	SEP	9/30/90	30	0	?	301,100	0.010037	0	301,100	0.010037
9/30/90			9/30/90		0 ?				0		
10/31/90	31	OCT	10/31/90	31	0	?	443,900	0.014319	0	443,900	0.014319
10/31/90			10/31/90		0 ?				0		
11/30/90	30	NOV	11/30/90	30	0	?	401,400	0.013380	0	401,400	0.013380
11/30/90			11/30/90		0 ?				0		
12/31/90	31	DEC	12/31/90	31	0	?	313,500	0.010113	0	313,500	0.010113
12/31/90			12/31/90		0 ?				0		
1/31/91	31	JAN '91	1/31/91	31	0	?	0	0.000000	0	0	0.000000
TOTALS:	365			365	0	(11,287,000)	3,451,900	0.009457	45,595	3,497,595	0.009582
		1990							3,451,900		
					MAX:	0.014319	MIN:	0.007601	3,497,595	0.009582	

1990 AWUDS Monthly and Yearly Water-Use Calculations Worksheet

Facility Name: NOME JOINT UTILITY FAA HOUSING

File Type and Number: ADL 42933 Sequence Number: 04 W

REPORT DATE	ACTUAL DAYS	MONTH	MONTH DATES	NORMAL DAYS	DAY FACTOR	METER READING	GALLONS	MGD	ADJUSTED GALLONS	NEW GALLONS	ADJUSTED MGD
11/16/89			11/30/89		14	435,000			(70,457)		
12/16/89	30	DEC '89	12/31/89	31	-15	586,000	151,000	0.005033	71,513	152,146	0.004908
12/16/89			12/31/89		15	586,000			(71,513)		
1/16/90	31	JAN	1/31/90	31	-15	734,000	148,000	0.004774	55,161	131,548	0.004243
1/16/90			1/31/90		15	734,000			(55,161)		
2/16/90	31	FEB	2/28/90	28	-12	848,000	114,000	0.003677	84,857	143,696	0.005132
2/16/90			2/28/90		12	848,000			(84,857)		
3/16/90	28	MAR	3/31/90	31	-15	1,046,000	198,000	0.007071	49,113	162,256	0.005234
3/16/90			3/31/90		15	1,046,000			(49,113)		
4/16/90	31	APR	4/30/90	30	-14	1,147,500	101,500	0.003274	42,933	85,380	0.003177
4/16/90			4/30/90		14	1,147,500			(42,933)		
5/16/90	30	MAY	5/31/90	31	-15	1,239,500 1,071,000	92,000	0.003067	81,532	130,599	0.004213
5/16/90			5/31/90		15	1,239,500			(81,532)		
6/16/90	31	JUN	6/30/90	30	-14	822,000	168,500	0.005435	77,000	163,968	0.005466
6/16/90			6/30/90		14	822,000			(77,000)		
7/16/90	30	JUL	7/31/90	31	-15	987,000	165,000	0.005500	65,774	154,774	0.004993
7/16/90			7/31/90		15	987,000			(66,774)		
8/16/90	31	AUG	8/31/90	31	-15	1,125,000	138,000	0.004452	144,000	315,226	0.006943
8/31/90			8/31/90		0	1,125,000			0		
9/30/90	30	SEP	9/30/90	30	0	?	288,000	0.009600	0	338,000	0.009600
9/30/90			9/30/90		0 ?				0		
10/31/90	31	OCT	10/31/90	31	0	?	150,000	0.004839	0	150,000	0.004839
10/31/90			10/31/90		0 ?				0		
11/30/90	30	NOV	11/30/90	30	0	?	158,000	0.005267	0	158,000	0.005267
11/30/90			11/30/90		0 ?				0		
12/31/90	31	DEC	12/31/90	31	0	?	200,000	0.006452	0	200,000	0.006452
12/31/90			12/31/90		0 ?				0		
1/31/91	31	JAN '91	1/31/91	31	0	?	0	0.000000	0	0	0.000000
TOTALS:	365			365	0	(586,000)	1,921,000	0.005263	72,387	1,993,387	0.005461
		1990							1,921,000		
					MAX:	0.009600		MIN:	0.003177	1,993,387	0.005461

1990 AKWUDS Monthly and Yearly Water-Use Calculations Worksheet

Facility Name: NOME JOINT UTILITIES WATER TREATMENT PLANT

File Type and Number: ADL 42993 Sequence # : 01 W

DATE	DAYS	METER READING	GALLONS	MGD	MONTH
12/31/89	-	-	-	-	-
1/31/90	31	-	14,278,000	0.460581	JAN
2/28/90	28	-	13,315,000	0.475536	FEB
3/31/90	31	-	15,847,000	0.511194	MAR
4/30/90	30	-	14,833,000	0.494433	APR
5/31/90	31	-	13,514,000	0.435935	MAY
6/30/90	30	-	13,893,913	0.463130	JUN
7/31/90	31	-	13,980,000	0.450968	JUL
8/31/90	31	-	14,693,000	0.473968	AUG
9/30/90	30	-	15,594,000	0.519800	SEP
10/31/90	31	-	13,709,000	0.442226	OCT
11/30/90	30	-	12,991,000	0.433033	NOV
12/31/90	31	-	13,224,000	0.426581	DEC
TOTALS:	365	-	169,871,913	0.465403	1990
MAX:		0.519800	MIN:	0.426581	

1990 AKWUDS Monthly and Yearly Water-Use Calculations Worksheet

Facility Name: NOME JOINT UTILITIES WASTEWATER TREAT. PLANT

File Type and Number: ADL 42993 Sequence # : 01 R

DATE	DAYS	METER READING	GALLONS	MGD	MONTH
12/31/89	-	-	-	-	-
1/31/90	31	-	8,704,800	0.280800	JAN
2/28/90	28	-	7,862,400	0.280800	FEB
3/31/90	31	-	8,704,800	0.280800	MAR
4/30/90	30	-	8,424,000	0.280800	APR
5/31/90	31	-	8,704,800	0.280800	MAY
6/30/90	30	-	8,424,000	0.280800	JUN
7/31/90	31	-	8,424,000	0.271742	JUL
8/31/90	31	-	8,704,800	0.280800	AUG
9/30/90	30	-	8,424,000	0.280800	SEP
10/31/90	31	-	8,704,800	0.280800	OCT
11/30/90	30	-	8,424,000	0.280800	NOV
12/31/90	31	-	8,424,000	0.271742	DEC
TOTALS:	365	-	101,930,400	0.279261	1990
MAX:		0.280800	MIN:	0.271742	

APPENDIX B

STATE OF ALASKA, CERTIFICATION OF POPULATION

STATE OF ALASKA

DEPT. OF COMMUNITY & REGIONAL AFFAIRS

OFFICE OF THE COMMISSIONER

WALTER J. HICKEL, GOVERNOR

☑ *P.O. BOX B*
JUNEAU, ALASKA 99811-2100
PHONE: (907) 465-4700 4500 State Demography

☐ *949 E. 36TH AVENUE, SUITE 400*
ANCHORAGE, ALASKA 99508-4302
PHONE: (907) 563-1073

December 15, 1990

CERTIFICATION OF POPULATION

Under the authority vested in me by AS 29.60.020, AS 29.60.150, and AS 29.60.370, I, David G. Hoffman, Commissioner of the Department of Community and Regional Affairs, do hereby certify the population of each municipality as of July 1, 1990, as shown on the attached "Municipal Population Report."

Date 12-17-91

David G. Hoffman
Commissioner

465-4500 State Demographer — Eielson A.F.B. included in City of Fairbanks population state.
Ft. Wainwright = 7,860 Eielson = 5,314
Ft. Richardson and Elmendorf A.F.B. populations included in M.O.A. figures.
Clear Air Station = 265

21-PILH

Municipalities	Population
Akhiok[8]	93
Akiak	272
Akutan[1]	432
Alakanuk	559
Aleknagik	160
Aleutians East Borough*	2,567
Allakaket	207
Ambler[12]	312
Anaktuvuk Pass[11]	246
Anchorage, Municipality of**	230,185
Anderson[3]	646
Angoon	685
Aniak	578
Anvik	101
Atka	107
Atmautluak	247
Atqasuk[11]	217
Barrow[11]	3,379
Bethel	4,470
Bettles	45
Brevig Mission	197
Bristol Bay Borough*	1,451
Buckland[12]	302
Chefornak	302
Chevak	598
Chignik[9]	128
Chuathbaluk	127
Clark's Point	87
Coffman Cove	180
Cold Bay[1]	158
Cordova	2,619
Craig	1,535
Deering[12]	154
Delta Junction	1,185
Denali Borough*	1,992
Dillingham	2,232
Diomede	171
Eagle	169
Eek	261
Ekwok	126
Elim	285
Emmonak	675
Fairbanks[4]	28,853
Fairbanks North Star Borough*	74,031
False Pass[1]	69
Fort Yukon	646
Galena	928
Gambell	520
Golovin	154

Inmates of Correctional Facilities are counted as residents of the community in which the prison is in, if they are residents of that prison for 6 months and a day.

The same principle applied to transient workers, i.e. fish processors.

∴ I am assuming all inmates will be counted toward local populations.

Municipalities	Population
Goodnews Bay	244
Grayling	228
Haines[5]	1,173
Haines Borough*	2,058
Holy Cross	276
Homer[6]	4,513
Hoonah	894
Hooper Bay	807
Houston[10]	738
Hughes	60
Huslia	225
Hydaburg	457
Juneau, City & Borough**	28,881
Kachemak[6]	418
Kake	682
Kaktovik[11]	224
Kaltag	253
Kasaan	80
Kasigluk	445
Kenai[6]	6,543
Kenai Peninsula Borough*	40,312
Ketchikan[7]	7,943
Ketchikan Gateway Borough*	13,259
Kiana[12]	414
King Cove[1]	831
Kivalina[12]	307
Klawock	897
Kobuk[12]	93
Kodiak[8]	6,787
Kodiak Island Borough*	15,679
Kotlik	489
Kotzebue[12]	2,961
Koyuk	250
Koyukuk	143
Kupreanof	52
Kwethluk	563
Lake & Peninsula Borough*	1,844
Larsen Bay[8]	149
Lower Kalskag	283
Manokotak	377
Marshall (Fortuna Ledge)	294
Matanuska-Susitna Borough*	38,953
McGrath	533
Mekoryuk	197
Metlakatla (Other)	1,386
Mountain Village	755
Napakiak	343
Napaskiak	334
Nenana	555

Municipalities	Population
New Stuyahok	375
Newhalen[9]	168
Newtok	213
Nightmute	167
Nikolai	113
Nome	4,503
Nondalton[9]	229
Noorvik[12]	600
North Pole[4]	1,644
North Slope Borough*	7,813
Northwest Arctic Borough*	7,081
Nuiqsut[11]	316
Nulato	380
Nunapitchuk (Akolmiut)	390
Old Harbor[8]	322
Ouzinkie[8]	216
Palmer[10]	3,300
Pelican	290
Petersburg	3,576
Pilot Station	465
Platinum	58
Point Hope[11]	610
Port Alexander	119
Port Heiden[9]	126
Port Lions[8]	300
Quinhagak	511
Ruby	243
Russian Mission	266
Saint George	188
Saint Mary's	491
Saint Michael	299
Saint Paul	586
Sand Point[1]	1,003
Savoonga	511
Saxman[7]	320
Scammon Bay	317
Selawik[12]	672
Seldovia[6]	512
Seward[6]	2,829
Shageluk	152
Shaktoolik	184
Sheldon Point	131
Shishmaref	448
Shungnak[12]	224
Sitka, City & Borough**	8,526
Skagway	718
Soldotna[6]	3,733
Stebbins	404

Municipalities	Population
Tanana	422
Teller	248
Tenakee Springs	108
Thorne Bay	614
Togiak	713
Toksook Bay	446
Tuluksak	357
Tununak	315
Unalakleet	740
Unalaska	2,265
Upper Kalskag	173
Valdez	4,635
Wainwright[11]	501
Wales	147
Wasilla[10]	3,818
White Mountain	180
Whittier	299
Wrangell	2,630
Yakutat	527

* Total borough population.

** Unified Home Rule Municipalities.

1 = City located within the Aleutians East Borough
2 = City located within the Bristol Bay Borough (none)
3 = City located within the Denali Borough
4 = City located within the Fairbanks North Star Borough
5 = City located within the Haines Borough
6 = City located within the Kenai Peninsula Borough
7 = City located within the Ketchikan Gateway Borough
8 = City located within the Kodiak Island Borough
9 = City located within the Lake and Peninsula Borough
10 = City located within the Matanuska-Susitna Borough
11 = City located within the North Slope Borough
12 = City located within the Northwest Arctic Borough

Boroughs And Cities Within Boroughs Population Summaries For FY 92 SRS/MA Progam

Boroughs	Cities Within Boroughs	Population	Total of Cities Within Each Borough	Total, Each Borough Less Cities
1. Aleutians East		2,567	2,493	74
	Akutan	432		
	Cold Bay	158		
	False Pass	69		
	King Cove	831		
	Sand Point	1,003		
2. Bristol Bay		1,451	na	na
	No cities	na		
3. Denali		1,992	646	1,346
	Anderson	646		
4. Fairbanks North Star		74,031	30,497	43,534
	Fairbanks	28,853		
	North Pole	1,644		
5. Haines		2,058	1,173	885
	Haines	1,173		
6. Kenai Peninsula		40,312	18,548	21,764
	Homer	4,513		
	Kachemak	418		
	Kenai	6,543		
	Seldovia	512		
	Seward	2,829		
	Soldotna	3,733		
7. Ketchikan Gateway		13,259	8,263	4,996
	Ketchikan	7,943		
	Saxman	320		
8. Kodiak Island		15,679	7,867	7,812
	Akhiok	93		
	Kodiak	6,787		
	Larsen Bay	149		
	Old Harbor	322		
	Ouzinkie	216		
	Port Lions	300		
9. Lake and Peninsula		1,844	651	1,193
	Chignik	128		
	Newhalen	168		
	Nondalton	229		
	Port Heiden	126		
10. Matanuska-Susitna		38,953	7,856	31,097
	Houston	738		
	Palmer	3,300		
	Wasilla	3,818		
11. North Slope		7,813	5,493	2,320
	Anaktuvuk Pass	246		
	Atqasuk	217		
	Barrow	3,379		
	Kaktovik	224		
	Nuiqsut	316		
	Point Hope	610		
	Wainwright	501		
12. Northwest Arctic		7,081	6,039	1,042
	Ambler	312		
	Buckland	302		
	Deering	164		
	Kiana	414		
	Kivalina	307		
	Kobuk	93		
	Kotzebue	2,961		
	Noorvik	600		
	Selawik	672		
	Shungnak	224		
Unified Home Rule Municipalities				
13. Municipality of Anchorage		230,185		
14. City and Borough of Juneau		28,881		
15. City and Borough of Sitka		8,526		

APPENDIX C

BUREAU OF THE CENSUS, 1990 POPULATION TOTALS

FORM: D-69 ALASKA Bureau of the Census
PAGE 1 OF 14 1990 Population Totals Department of Commerce

This table provides 1990 census population counts for states and governmental units. Since these counts provide only totals for the states and local governmental units, they are not suitable for redistricting. As required by Public Law 94-171, the Bureau of the Census will provide redistricting counts at the block level for all states and the District of Columbia. The counts will be released on a state-by-state basis beginning in early 1991 and ending by April 1, 1991.

The population counts set forth herein are subject to possible correction for undercount or overcount. The United States Department of Commerce is considering whether to correct these counts and will publish corrected counts, if any, not later than July 15, 1991.

(011091)

GOVERNMENTAL UNIT CODE	NAME	Number of Persons
ST 02	ALASKA	550,043
CO 02 013	Aleutians East Borough	2,464
CO 02 016	Aleutians West Census Area	9,478
CO 02 020	Anchorage Borough	226,338
CO 02 050	Bethel Census Area	13,656
CO 02 060	Bristol Bay Borough	1,410
CO 02 070	Dillingham Census Area	4,012
CO 02 090	Fairbanks North Star Borough	77,720
CO 02 100	Haines Borough	2,117
CO 02 110	Juneau Borough	26,751
CO 02 122	Kenai Peninsula Borough	40,802
CO 02 130	Ketchikan Gateway Borough	13,828
CO 02 150	Kodiak Island Borough	13,309
CO 02 164	Lake and Peninsula Borough	1,668
CO 02 170	Matanuska-Susitna Borough	39,683
CO 02 180	Nome Census Area	8,288
CO 02 185	North Slope Borough	5,979
CO 02 188	Northwest Arctic Borough	6,113
CO 02 201	Prince of Wales-Outer Ketchikan Census Area	6,278
CO 02 220	Sitka Borough	8,588
CO 02 231	Skagway-Yakutat-Angoon Census Area	4,385
CO 02 240	Southeast Fairbanks Census Area	5,913
CO 02 261	Valdez-Cordova Census Area	9,952
CO 02 270	Wade Hampton Census Area	5,791
CO 02 280	Wrangell-Petersburg Census Area	7,042
CO 02 290	Yukon-Koyukuk Census Area	8,478

Leo Schilling
1-30-91
1-206-728-5300

Sonya Stenkie
728-5314
Military Base Pop

- Military Base populations include only those people actually residing on base. Off base population is included in the cities they reside.
- Prison populations are counted for the city in which they are located when inmates are "long term". The length of time was not mentioned but I used > 6mos. (next page)

This table provides 1990 census population counts for states and governmental units. Since these counts provide only totals for the states and local governmental units, they are not suitable for redistricting. As required by Public Law 94-171, the Bureau of the Census will provide redistricting counts at the block level for all states and the District of Columbia. The counts will be released on a state-by-state basis beginning in early 1991 and ending by April 1, 1991.

The population counts set forth herein are subject to possible correction for undercount or overcount. The United States Department of Commerce is considering whether to correct these counts and will publish corrected counts, if any, not later than July 15, 1991.

(011091)

GOVERNMENTAL UNIT CODE	NAME	Number of Persons
PL 02 0030	Akhiok city	77
PL 02 0050	Akiak city	285
PL 02 0070	Akutan city	589
PL 02 0080	Alakanuk city	544
PL 02 0090	Aleknagik city	185
PL 02 0100	Allakaket city	170
PL 02 0110	Ambler city	311
PL 02 0120	Anaktuvuk Pass city	259
PL 02 0140	Anchorage city	226,338
PL 02 0150	Anderson city	628
PL 02 0160	Angoon city	638
PL 02 0170	Aniak city	540
PL 02 0190	Anvik city	82
PL 02 0210	Atka city	73
PL 02 0220	Atqasuk city	216
PL 02 0250	Barrow city	3,469
PL 02 0310	Bethel city	4,674
PL 02 0315	Bettles city	36
PL 02 0400	Brevig Mission city	198
PL 02 0430	Buckland city	318
PL 02 0590	Chefornak city	320
PL 02 0610	Chevak city	598
PL 02 0640	Chignik city	188
PL 02 0690	Chuathbaluk city	97
PL 02 0740	Clarks Point city	60
PL 02 0770	Coffman Cove city	186
PL 02 0780	Cold Bay city	148
PL 02 0820	Cordova city	2,110
PL 02 0830	Craig city	1,260
PL 02 0860	Deering city	157

5-22-91 Connie 1-206-728-5300 Ft. Richardson & Elmendorf Air Force Base Populations are included in the Anchorage statistics. Per state demographers.

This table provides 1990 census population counts for states and governmental units. Since these counts provide only totals for the states and local governmental units, they are not suitable for redistricting. As required by Public Law 94-171, the Bureau of the Census will provide redistricting counts at the block level for all states and the District of Columbia. The counts will be released on a state-by-state basis beginning in early 1991 and ending by April 1, 1991.

The population counts set forth herein are subject to possible correction for undercount or overcount. The United States Department of Commerce is considering whether to correct these counts and will publish corrected counts, if any, not later than July 15, 1991.

(011091)

GOVERNMENTAL UNIT CODE	NAME	Number of Persons
PL 02 0870	Delta Junction city	652
PL 02 0880	Dillingham city	2,017
PL 02 0890	Diomede city	178
PL 02 0930	Eagle city	168
PL 02 0960	Eek city	254
PL 02 1000	Ekwok city	77
PL 02 1020	Elim city	264
PL 02 1030	Emmonak city	642
PL 02 1080	Fairbanks city	30,843
PL 02 1120	Fort Yukon city	580
PL 02 1160	Galena city	833
PL 02 1170	Gambell city	525
PL 02 1220	Golovin city	127
PL 02 1235	Goodnews Bay city	241
PL 02 1250	Grayling city	208
PL 02 1280	Haines city	1,238
PL 02 1360	Holy Cross city	277
PL 02 1370	Homer city	3,660
PL 02 1380	Hoonah city	795
PL 02 1390	Hooper Bay city	845
PL 02 1410	Houston city	697
PL 02 1420	Hughes city	54
PL 02 1430	Huslia city	207
PL 02 1440	Hydaburg city	384
PL 02 1510	Juneau city	26,751
PL 02 1520	Kachemak city	365
PL 02 1540	Kake city	700
PL 02 1560	Kaktovik city	224
PL 02 1580	Kaltag city	240
PL 02 1600	Kasaan city	54

This table provides 1990 census population counts for states and governmental units. Since these counts provide only totals for the states and local governmental units, they are not suitable for redistricting. As required by Public Law 94-171, the Bureau of the Census will provide redistricting counts at the block level for all states and the District of Columbia. The counts will be released on a state-by-state basis beginning in early 1991 and ending by April 1, 1991.

The population counts set forth herein are subject to possible correction for undercount or overcount. The United States Department of Commerce is considering whether to correct these counts and will publish corrected counts, if any, not later than July 15, 1991.

(011091)

GOVERNMENTAL UNIT CODE	GOVERNMENTAL UNIT NAME	Number of Persons
PL 02 1630	Kenai city	6,327
PL 02 1650	Ketchikan city	8,263
PL 02 1660	Kiana city	385
PL 02 1670	King Cove city	451
PL 02 1710	Kivalina city	317
PL 02 1720	Klawock city	722
PL 02 1741	Kobuk city	69
PL 02 1750	Kodiak city	6,365
PL 02 1790	Kotlik city	461
PL 02 1800	Kotzebue city	2,751
PL 02 1810	Koyuk city	231
PL 02 1820	Koyukuk city	126
PL 02 1826	Kupreanof city	23
PL 02 1830	Kwethluk city	558
PL 02 1860	Larsen Bay city	147
PL 02 1950	Lower Kalskag city	291
PL 02 1962	McGrath city	528
PL 02 1980	Manokotak city	385
PL 02 1990	Marshall city	273
PL 02 2060	Mekoryuk city	177
PL 02 2160	Mountain Village city	674
PL 02 2230	Napakiak city	318
PL 02 2235	Napaskiak city	328
PL 02 2270	Nenana city	393
PL 02 2290	Newhalen city	160
PL 02 2300	New Stuyahok city	391
PL 02 2320	Nightmute city	153
PL 02 2330	Nikolai city	109
PL 02 2370	Nome city	3,500
PL 02 2380	Nondalton city	178

This table provides 1990 census population counts for states and governmental units. Since these counts provide only totals for the states and local governmental units, they are not suitable for redistricting. As required by Public Law 94-171, the Bureau of the Census will provide redistricting counts at the block level for all states and the District of Columbia. The counts will be released on a state-by-state basis beginning in early 1991 and ending by April 1, 1991.

The population counts set forth herein are subject to possible correction for undercount or overcount. The United States Department of Commerce is considering whether to correct these counts and will publish corrected counts, if any, not later than July 15, 1991.

(011091)

GOVERNMENTAL UNIT CODE	NAME	Number of Persons
PL 02 2390	Noorvik city	531
PL 02 2410	North Pole city	1,456
PL 02 2436	Nuiqsut city	354
PL 02 2440	Nulato city	359
PL 02 2460	Nunapitchuk city	378
PL 02 2480	Old Harbor city	284
PL 02 2500	Ouzinkie city	209
PL 02 2510	Palmer city	2,866
PL 02 2550	Pelican city	222
PL 02 2585	Petersburg city	3,207
PL 02 2620	Pilot Station city	463
PL 02 2640	Platinum city	64
PL 02 2660	Point Hope city	639
PL 02 2690	Port Alexander city	119
PL 02 2730	Port Heiden city	119
PL 02 2750	Port Lions city	222
PL 02 2780	Quinhagak city	501
PL 02 2820	Ruby city	170
PL 02 2830	Russian Mission city	246
PL 02 2850	St. George city	138
PL 02 2860	St. Mary's city	441
PL 02 2870	St. Michael city	295
PL 02 2880	St. Paul city	763
PL 02 2900	Sand Point city	878
PL 02 2910	Savoonga city	519
PL 02 2920	Saxman city	369
PL 02 2930	Scammon Bay city	343
PL 02 2940	Selawik city	596
PL 02 2950	Seldovia city	316
PL 02 2960	Seward city	2,699

This table provides 1990 census population counts for states and governmental units. Since these counts provide only totals for the states and local governmental units, they are not suitable for redistricting. As required by Public Law 94-171, the Bureau of the Census will provide redistricting counts at the block level for all states and the District of Columbia. The counts will be released on a state-by-state basis beginning in early 1991 and ending by April 1, 1991.

The population counts set forth herein are subject to possible correction for undercount or overcount. The United States Department of Commerce is considering whether to correct these counts and will publish corrected counts, if any, not later than July 15, 1991.

(011091)

GOVERNMENTAL UNIT CODE	NAME	Number of Persons
PL 02 2970	Shageluk city	139
PL 02 2980	Shaktoolik city	178
PL 02 2990	Sheldon Point city	109
PL 02 3010	Shishmaref city	456
PL 02 3030	Shungnak city	223
PL 02 3040	Sitka city	8,588
PL 02 3050	Skagway city	692
PL 02 3070	Soldotna city	3,482
PL 02 3130	Stebbins city	400
PL 02 3240	Tanana city	345
PL 02 3270	Teller city	151
PL 02 3290	Tenakee Springs city	94
PL 02 3310	Thorne Bay city	569
PL 02 3320	Togiak city	613
PL 02 3340	Toksook Bay city	420
PL 02 3350	Tuluksak city	358
PL 02 3365	Tununak city	316
PL 02 3420	Unalakleet city	714
PL 02 3430	Unalaska city	3,089
PL 02 3440	Upper Kalskag city	172
PL 02 3470	Valdez city	4,068
PL 02 3490	Wainwright city	492
PL 02 3500	Wales city	161
PL 02 3520	Wasilla city	4,028
PL 02 3540	White Mountain city	180
PL 02 3550	Whittier city	243
PL 02 3590	Wrangell city	2,479
PL 02 3610	Yakutat city	534
IR 02 0110	Annette Islands Reserve	1,469