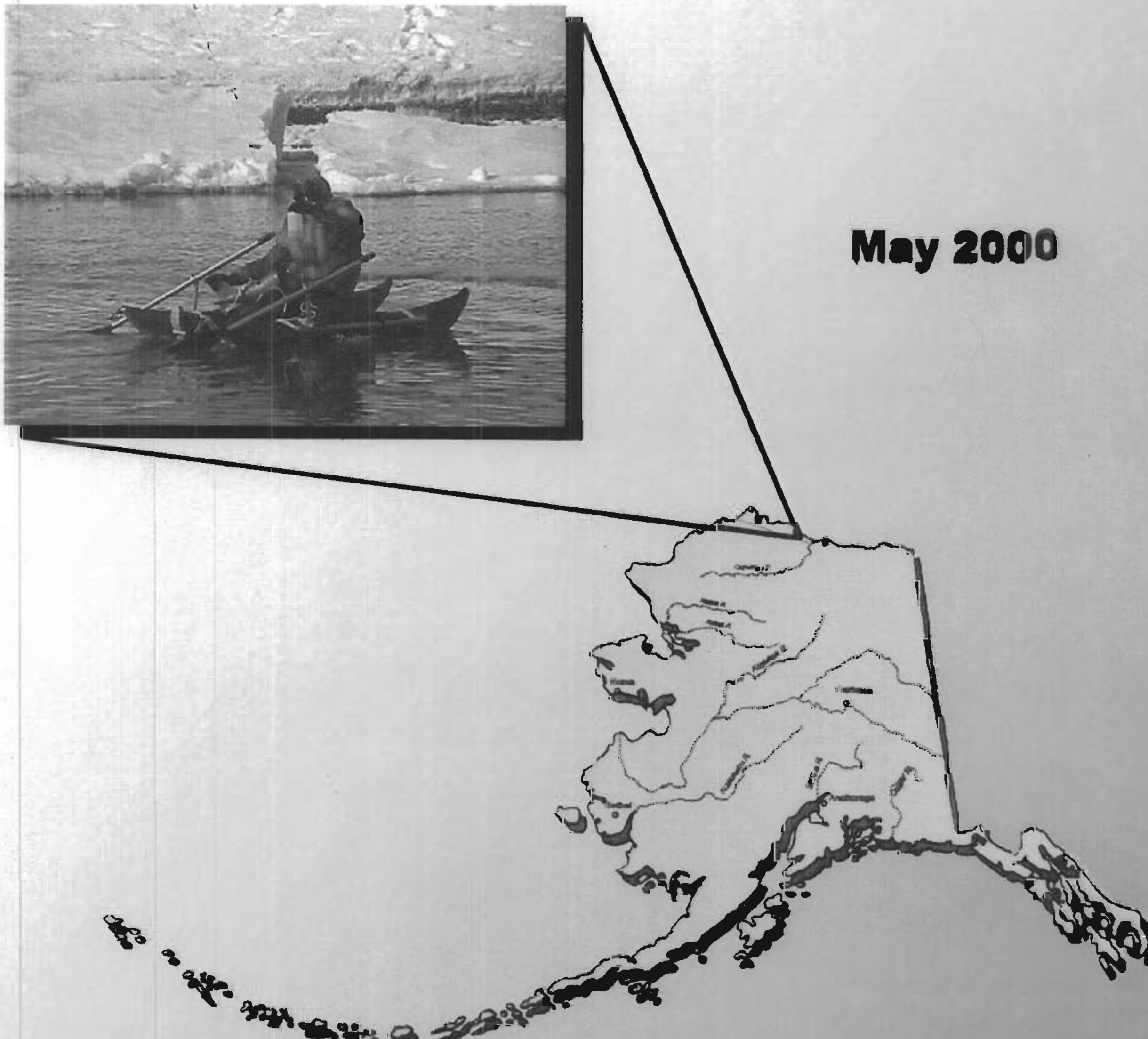
ALPINE DEVELOPMENT WATER SUPPLY
1999 MONITORING AND ASSESSMENT



May 2000

Prepared for:

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1.0 Executive Summary

Water surface elevation and water quality data were collected in Lake 93-12, Lake 93-13 and the Sakoonang Channel during the spring and summer of 1999 (Location Map, Appendix A). The purpose of collecting the data in Lakes 93-12 and 93-13 was primarily to satisfy permit stipulations associated with the Alpine Development (Alpine). The purpose of collecting the data in the Sakoonang Channel was to assess the potential for recharging Lakes 93-12 and 93-13 using water from the Sakoonang Channel.

As a result of the monitoring conducted in 1999 and the computations conducted for this report, the following can be concluded.

- The river inundated neither Lake 93-12 nor Lake 93-13 during 1999.
- Between 28 April and 25 September 1999 the net recharge of Lake 93-12 was approximately 9.4 million gallons (MG), and resulted from snowmelt and rainfall. Between 27 April and 25 September 1999, Lake 93-13 experienced a net loss of 4 MG. During this period, all of the water required for Alpine was withdrawn from Lake 93-13. No water was withdrawn from Lake 93-12.
- Depth averaged values of total suspended solids, salinity, conductivity, temperature, dissolved oxygen, and turbidity, as measured in the lakes between April and September, are presented in Tables 2.1 and 2.2.
- A statistical assessment of the long-term water balance associated with Lakes 93-12 and 93-13 suggests that even with periodic inundation of the lakes by the river, there is little chance (about 0.02 percent) that natural recharge will meet expected water demands during all of the first 7 years of operation. There is only about a 33 percent chance that natural recharge will provide sufficient water in 3 or more of the first 7 years. If it is assumed that the annual water demand will be constant at 10 MG in years 8 through 30 of operation, there is approximately a 0.5 percent chance that natural recharge will provide sufficient water to meet the expected demand in all 23 years. There is only about a 50 percent chance that natural recharge will provide sufficient water in 16 or more years of the 23-year period.
- Lakes 93-12 and 93-13 can probably be recharged annually using water from the Sakoonang Channel. However, to be sure of obtaining sufficient quantities of water from the Sakoonang Channel, the water will probably have to be taken during breakup. The water taken from the Sakoonang Channel during breakup is likely to be significantly higher in turbidity and

suspended solids than the water in Lakes 93-12 and 93-13. A comparison of the water quality in the lakes and the Sakoonang Channel is presented in Tables 4.1 and 4.2.

- Two other possibilities exist for recharging Lakes 93-12 and 93-13: snow fences and pumping from nearby lakes. Both of these options are discussed briefly in Section 5.0, but both require additional site specific information to determine if either option could practically provide sufficient water to make up the shortfall that is likely to occur in Lakes 93-12 and 93-13 over the life of the project.

2.0 Water Monitoring In Lakes 93-12 And 93-13

2.1 1999 Spring And Summer Water Level Monitoring

Water surface elevations were monitored in Lakes 93-12 and 93-13 during the period 27 April to 25 September 1999. A staff gage was installed in each lake, and the staff gages were read periodically throughout the monitoring period. The readings were converted to feet above British Petroleum Mean Sea Level and are reported as such in this report.

On Lake 93-12 the initial water surface elevation was obtained on 28 April. The lake was ice covered and the water surface elevation was 7.45 feet. The maximum water surface elevation occurred between 14 and 22 June. The lake was still 80 to 85 percent ice covered, and the water surface elevation was 7.93 feet. The first ice-free measurement was taken on 7 July, and indicated a water surface elevation of 7.87 feet. The final reading was taken on 25 September and indicated a water surface elevation of 7.74 feet. Thus, the final water surface elevation was 0.29 feet higher than the pre-breakup reading in April and 0.19 feet lower than the peak water surface elevation.

On Lake 93-13 the initial water surface elevation was measured on 27 April. The lake was ice covered and the water surface elevation was 5.91 feet. The maximum water surface elevation was measured on 9 June. The lake was still 95 percent ice covered, and the water surface elevation was 6.14 feet. The lake was ice-free on 28 June, and a water surface elevation of 5.99 feet was measured on 6 July. The final reading was taken on 25 September and indicated a water surface elevation of 5.73 feet. Thus, the final water surface elevation was 0.18 feet lower than the pre-breakup reading in April and 0.26 feet lower than the peak water surface elevation.

It should be noted that a relatively small change in water surface elevation results in a water volume change on the order of millions of gallons. A 1-inch change in water surface elevation on Lake 93-12 represents a water volume change on the order of 2.7 MG. A 1-inch change in water surface elevation on Lake 93-13 represents a water volume change on the order of 1.9 MG. Thus, there was a net gain of about 9.4 MG in Lake 93-12 and a net loss of about 4 MG in Lake 93-13 between late April and late September 1999.

All of the water supplied for the Alpine Development, during the 1999 water-monitoring program was withdrawn from Lake 93-13. No water was withdrawn from Lake 93-12. Additional information concerning the methods used and the data obtained is presented in Appendix B.

2.2 1999 Spring And Summer Water Quality Monitoring

A water quality monitoring program was conducted in both Lake 93-12 and Lake 93-13. Total suspended solids, salinity, conductivity, temperature, dissolved oxygen, and turbidity were measured at multiple depths within each lake. All of the parameters except total suspended solids and turbidity were measured directly with probes in the field. Turbidity and total suspended solids were measured by obtaining water samples and analyzing the samples in a laboratory. The average of the values obtained at each site, on each day of sampling, is summarized in Tables 2.1 and 2.2. Additional information concerning the methods and the data obtained is provided in Appendix B.

Table 2.1 Lake 93-12 1999 Water Quality

Reading Date	Turbidity (NTU)	Total Suspended Solids (mg/L)	Temperature (°F)	Salinity (ppt)	Conductivity (µS)	Dissolved Oxygen (mg/L)
4/28/99	2.3	n/a	36.2	0.1	n/a	12.7
7/14/99	1.4	12.0	57.4	0.0	63.9	10.7
8/25/99	1.9	1.5	42.4	0.0	51.7	12.3
9/21/99	1.1	<MRL	38.3	0.0	48.9	13.3

Notes:
1. Abbreviations: NTU is Nephelometric Turbidity Unit, mg/L is milligrams per liter, °F is degrees Fahrenheit, µS = micro siemens, ppt = parts per thousand, and <MRL is below method detection limit.
2. All of the values reported are average values based on the values obtained at multiple depths. See Table B-3 and Figure B-3 (Appendix B) to obtain the values measured at each depth.

Table 2.2 Lake 93-13 1999 Water Quality						
Reading Date	**Turbidity (NTU)**	**Total Suspended Solids (mg/L)**	**Temperature (F)**	**Salinity (ppt)**	**Conductivity (µS)**	**Dissolved Oxygen (mg/L)**
4/27/99	2	n/a	34.7	0.2	N/a	8.6
6/25/99	1.6	n/a	41.1	0.1	108.9	13.6
7/14/99	1.3	14.0	57.6	0.1	137.8	10.5
8/25/99	5.2	9.2	41.9	0.1	114.5	12.5
9/20/99	2.1	2.9	38.3	0.1	111.3	13.4

Notes:

1. Abbreviations: NTU is Nephelometric Turbidity Unit, mg/L is milligrams per liter, °F is degrees Fahrenheit, µS = micro siemens, ppt = parts per thousand, and <MRL is below method detection limit.
2. All of the values reported are average values based on the values obtained at multiple depths. See Table B-3 and Figure B-3 (Appendix B) to obtain the values measured at each depth.

3.0 Probable Long-Term Water Balance In Lakes 93-12 And 93-13

This section presents an estimate of the annual fluctuations likely to occur in the water volumes of Lakes 93-12 and 93-13. This information is then used to predict the likelihood that these lakes will be able to supply a sufficient volume of water to meet the needs of Alpine.

3.1 Data

Since there are no long-term meteorological data for Alpine, accumulated snowfall, summer precipitation, and evaporation rates measured at Kuparuk between 1986 and 1998 were used to conduct this analysis (Appendix D). Kuparuk is located approximately 45 miles east of Alpine and is approximately the same distance from the coast.

Table 3.1 Estimated Water Requirements For The Alpine Development

Year	Annual Water Requirement (million gallons)
2000	34.16
2001	30.48
2002	21.89
2003	21.89
2004	21.89
2005	9.97
2006	10.07

In addition to rainfall and snowmelt, inundation by the river also adds water to the lakes. Breakup observations in 1995, 1996, 1998, and 1999 indicate that the lakes are likely to be inundated approximately once every four years.

The water requirements of Alpine have been estimated (Powell, 1999) for the first 7 years of operation and are presented in Table 3.1. The maximum allowable water withdrawal from Lakes 93-12 and 93-13 is controlled by permit stipulation and totals 36.2 MG for the two lakes (Fowler, 1999).

3.2 Analysis

Based on statistical distributions developed from the historical data and the estimated water requirements of the facility, a Monte Carlo (Haan, 1979) technique was utilized to predict the probability that an adequate volume of water will be available to meet the needs of Alpine (Appendix D). The model assumes that the lakes are full at the beginning of the simulation (i.e., the spring of 2000) and after the years in which the river inundates the lakes. The computations for each year of the simulation involve randomly selecting the magnitude of snowmelt runoff, summer rainfall, and summer evaporation from statistical distributions based on the actual data collected at Kuparuk. The expected useable volume of water (36.2 MG when the lakes are full) for the current year is calculated by summing the useable volume remaining from the previous year, and the snowmelt runoff, summer rainfall and evaporation for the current year. To determine if there will be sufficient water available to meet the expected demand in the current year, the expected water demand for the current year is subtracted from the expected useable volume for the current year. If the expected useable volume equals or exceeds the expected demand, there will be a sufficient volume of water to meet Alpine's requirements.

Two analyses were conducted: one for the first 7 years of operation, and another for the next 23 years (years 8-30) of operation. For the second analysis it was assumed that the water demand would remain constant at 10 MG per year.

The first analysis indicates that there is only a 0.02 percent chance that natural recharge of Lakes 93-12 and 93-13 will provide sufficient water to meet the expected water demands during each of the first 7 years of operation. There is a 33 percent chance that natural recharge will provide sufficient water in 3 or more of the first 7 years. Additional information on the probability of meeting the expected water demand during the first seven years is presented in Table 3.2.

Table 3.2 Probability Of An Adequate Water Supply During The First Seven Years of Alpine Operations

Number of Years with Adequate Supply	Probability (%)
All 7	Less than 1
6 or more	Less than 1
5 or more	3
4 or more	12
3 or more	33
2 or more	63
1 or more	88

The second analysis indicates that there is a 0.47 percent chance that natural recharge of Lakes 93-12 and 93-13 will provide sufficient water to meet the expected water demands during each year of the remaining 23-year economic life of Alpine. There is a 50 percent chance that natural recharge will provide sufficient water in 16 or more years of the remaining 23 years. Additional information on the probability of meeting the expected water demand during years 8 through 30 of Alpine operations is presented in Table 3.3.

Table 3.3	Probability Of An Adequate Water Supply During Years 8 through 30 of Alpine Operations				
Number of Years with Adequate Supply	**Probability (%)**	**Number of Years with Adequate Supply**	**Probability (%)**	**Number of Years with Adequate Supply**	**Probability (%)**
All 23	Less than 1	15 or more	61	7 or more	99
22 or more	2	14 or more	72	6 or more	100
21 or more	5	13 or more	80	5 or more	100
20 or more	10	12 or more	87	4 or more	100
19 or more	17	11 or more	92	3 or more	100
18 or more	27	10 or more	95	2 or more	100
17 or more	38	9 or more	98	1 or more	100
16 or more	50	8 or more	99		

Thus, it is not likely that natural recharge of Lakes 93-12 and 93-13 will provide the water necessary to meet the water demands of the Alpine Development. Artificial means of recharging the existing water supply lakes, or development of an alternative water source, should be considered. Additional information concerning the data and computations used in the analyses are presented in Appendix D.

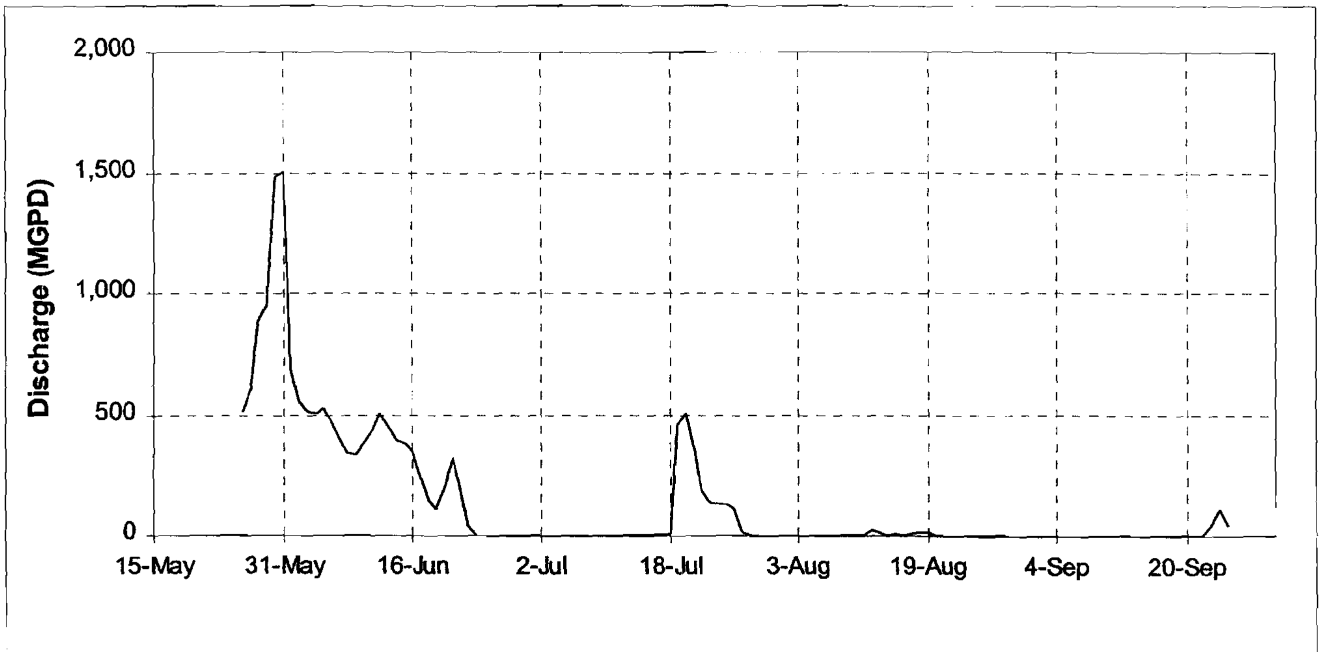
4.0 Artificial Lake Recharge Using Water From The Sakoonang Channel

4.1 Water Availability

4.1.1 1999 Discharge Monitoring

Discharge was monitored in the Sakoonang Channel between 27 May and 25 September 1999. The discharge hydrograph presented in Figure 4.1 illustrates the flow patterns during the 1999 spring and summer season. High flows occurred during breakup and tapered off through the month of June. By the end of June, water was no longer flowing in the Sakoonang Channel, except for the occasional storm that caused short periods of flow.

Figure 4.1 1999 Average Daily Discharge in Sakoonang Channel



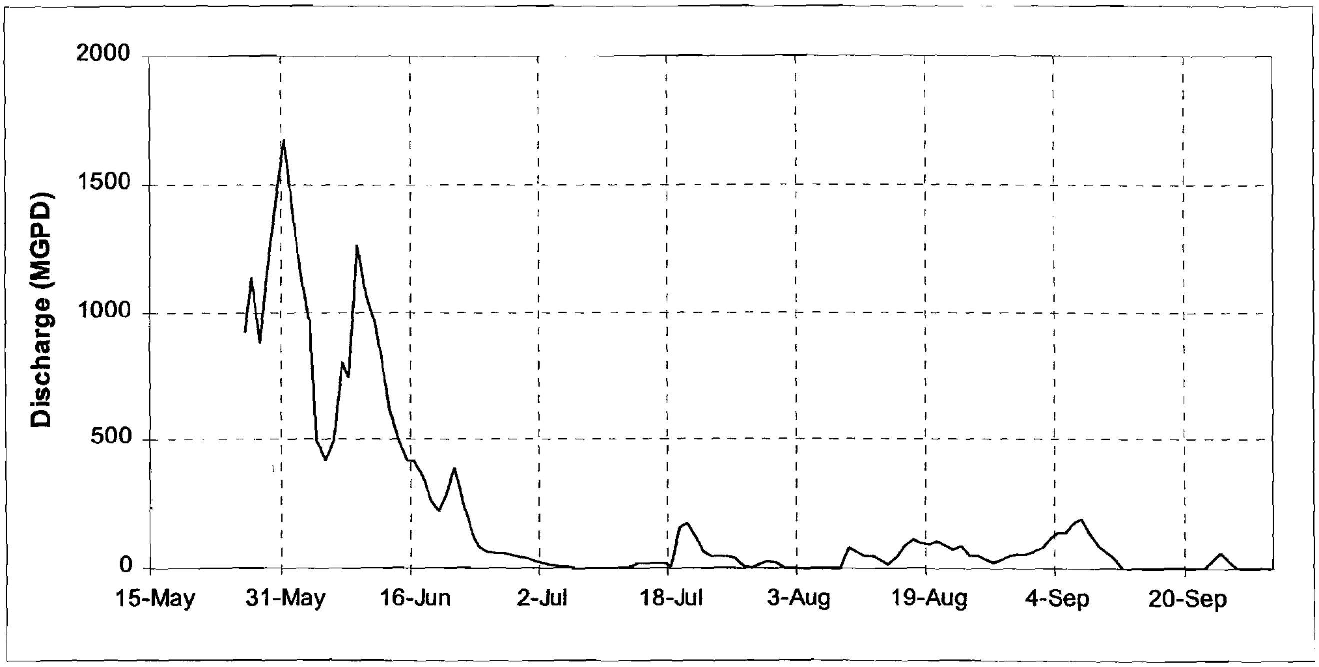
Based on historical flow data developed for the Sakoonang Channel (see Section 4.1.2), the quantity of water flowing through the Sakoonang Channel in 1999 was somewhat lower than the historical average.

A brief description of the methods used to collect the data and monthly summaries of the data (including hydrographs) are presented in Appendix C.

4.1.2 Estimates Of Historic Spring And Summer Discharge

There are no annual discharge data for the Sakoonang Channel beyond that collected in 1999. However, there are six years of water surface elevation data on the East Channel that can be used to estimate discharge in the Sakoonang Channel. The East Channel controls the amount of flow that enters the Sakoonang Channel. Using the data recorded in 1999 for the East and Sakoonang Channels, a relationship was developed to estimate historic discharges in the Sakoonang Channel. Using the relationship and the data collected in the East Channel, the average daily discharge in the Sakoonang Channel was computed (Appendix E) and is presented in Figure 4.2.

Figure 4.2 Long Term Mean Discharge in Sakoonang Channel



Although the discharge in the Sakoonang Channel varies from year to year (Figure E-1, Appendix E), Figure 4.2 provides a reasonable approximation of the long-term average flow conditions. For the purposes of this report, it is particularly important to note the dramatic drop in discharge that occurs during the later half of June, and the relatively low discharge throughout the summer. The prominence of the double peaks depicted in Figure 4.2 during late May and early June is related to a gap in the available data. Although a double peak is not uncommon, it is likely that as more data becomes available, the prominence of the double peak will decrease. Additional information concerning the data available and the methods used to estimate the historic discharges in the Sakoonang Channel are presented in Appendix E.

4.1.3 Quantity And Timing Of Discharge With Respect To Lake Recharge

In an average year, the Sakoonang Channel has more than enough water to fully recharge the water supply lakes. However, the length of time during which water can be transferred is limited. Flow in the Sakoonang Channel typically begins during the end of May and peaks during the first week of June. After the peak, the discharge typically drops throughout the rest of June and by the end of the month can be expected to be near zero. During the summer months the discharge in the channel will vary between zero and a relatively low flow, as storms pass through the drainage basin. Once fresh water stops flowing in the channel, the water quality will diminish in response to saltwater migrating up the channel from the ocean.

It is likely that fresh water could be pumped annually from the Sakoonang Channel over a 20-day period during breakup to artificially recharge Lakes 93-12 and 93-13. This presumes that pumping would start as soon as the channel ice is free from the banks and that the pumping would be completed before the spring flow decreased to zero.

4.2 Water Quality With Respect To Lake Recharge

In 1999 the water quality measurements made in the Sakoonang Channel (Location Map, Appendix A) consisted of temperature, salinity, conductivity, dissolved oxygen, turbidity, total suspended solids, primary inorganic chemicals, secondary contaminates, volatile organic chemicals, total Trihalomethanes, radioactive contaminates, total Coliform Bacteria, and other general water quality parameters. The procedures used to conduct the monitoring and the data collected are presented in Appendices C and F.

A comparison of the 1999 primary water quality data collected in Lakes 93-12 and 93-13, and the Sakoonang Channel is presented in Table 4.1. The data consists of temperature, salinity, conductivity, dissolved oxygen, turbidity, and total suspended solids. The data for the Sakoonang Channel represents the water quality during the period when water would likely be transferred from the Sakoonang Channel to recharge the lakes (i.e., May and June). The data presented for the lakes represents the lake water quality during the summer months.

As shown in Table 4.1, the turbidity and total suspended solids are noticeably higher in the Sakoonang Channel than in the lakes. Additionally, the turbidity and total suspended solids in the Sakoonang Channel are highest during spring breakup when it is most likely that water would be transferred to the lakes. Additional information concerning the water quality in the lakes and Sakoonang Channel is presented in Appendices B and C, respectively.

Table 4.1 Comparison Of Primary Water Quality Parameters										
Parameter	Units	Lake 93-13 (1)			Lake 93-12 (2)			Sakoonang Channel (3)		
		Average (4)	Median	Range	Average (4)	Median	Range	Average (4)	Median	Range
Temperature	°C	7.7	5.5	3.5 – 14.2	7.8	5.8	3.5 - 14.1	4.1	4.5	1.9 - 5.6
Salinity	ppt	0.1	0.1	0.1	0.0	0.0	0.0	0.1	0.1	0.0 - 0.1
Conductivity	µS	121.2	114.5	111.3 – 137.8	54.8	51.7	48.9 - 63.9	78.6	77.5	62.3 - 97.1
Dissolved Oxygen	mg/L	12.13	12.51	10.51 – 13.36	12.07	12.26	10.65 - 13.29	11.93	12.02	10.55 - 13.23
Turbidity (5)	NTU	2.9	2.1	1.3 - 5.2	1.8	1.4	1.3 - 2.7	63	70	31 - 80
Total Suspended Solids (6)	mg/L	8.7	9.2	2.9 – 14	4.7	1.5	<1.1 - 12	126	126	92 - 160

Notes:
1. The Average, Median and Range for Lake 93-13 were based on data obtained on 14 July, 25 August and 20 September 1999.
2. The Average, Median and Range for Lake 93-12 were based on data obtained on 14 July, 25 August and 21 September 1999.
3. Because it is expected that water would be drawn from the top 6 feet of the flow in the Sakoonang Channel, the Average, Median and Range for the Sakoonang Channel were based on data obtained in the top 6 feet or less of the flow on 3 June, 6 June, 8 June and 10 June 1999, except for turbidity which is based on sample dates 1 June, 6 June, 8 June and 10 June 1999, and total suspended solids which is based on sample dates 31 May and 6 June 1999.
4. The averages presented in the table were computed by first computing the average of the data collected on each sample date and then computing the average of the averages associated with sampling dates listed above. For parameters with values below the method detection limit, the average was calculated by replacing the less than detection limit value with a value equal to one-half the method detection limit.
5. Turbidity in the lakes was calculated one of two ways, either: the value from a 0 to depth-integrated sample was used, or a weighted average from discrete samples was used.
6. In the lakes, total suspended solids values are based on a depth-integrated sample from 0 to depth.

A comparison of the Lake 93-13 and the Sakoonang Channel data associated with the secondary water quality parameters is presented in Table 4.2. The data consists of primary inorganic chemicals, secondary contaminates, hardness, volatile organic chemicals, Trihalomethanes, radioactive contaminants, and total Coliform Bacteria. The data for Lake 93-13 was collected in 1998 (Northern Testing Laboratories, 1999) and represents the water quality during the summer months. The data for the Sakoonang Channel was collected in 1999 and represents the water quality during the period when water would likely be transferred from the Sakoonang Channel to recharge the lakes (i.e., May and June). Summer data are not available for Lake 93-12.

Although there is limited data from which to draw conclusions, it appears that color, and aluminum, iron, magnesium, and sulfate concentrations may be higher in the Sakoonang water than in Lake 93-13. The chloride and sodium concentrations in the Sakoonang water may be lower than in Lake 93-13. Additional information concerning the magnitude of the secondary water quality parameters in the lakes and Sakoonang Channel is presented in Appendices B, C and F.

Table 4.2 Comparison Of Secondary Water Quality Parameters

Parameter	Units	Lake 93-13 (1)			Sakoonang Channel (2)
		Average (3)	Median	Range	06/01/99
Primary Inorganic Chemicals					
Antimony	mg/L	<0.003	<0.003	<0.003	<0.002
Arsenic	mg/L	<0.004	<0.004	<0.004	0.003
Barium	mg/L	0.0689	0.0703	0.0631 – 0.0734	0.0988
Beryllium	mg/L	<0.0006	<0.0006	<0.0006	<0.0010
Cadmium	mg/L	<0.0001	<0.0001	<0.0001	0.0001
Chromium	mg/L	<0.003	<0.003	<0.003	0.003
Cyanide	mg/L	<0.02	<0.02	<0.02	<0.02
Fluoride	mg/L	0.25	<0.06	<0.06 – 0.70	<0.06
Mercury	mg/L	<0.0002	<0.0002	<0.0002	<0.0002
Nickel	mg/L	<0.005	<0.005	<0.005	<0.02
Nitrate	mg/L	<0.03	<0.03	<0.03	0.06
Selenium	mg/L	<0.004	<0.004	<0.004	<0.002
Thallium	mg/L	<0.001	<0.001	<0.001	<0.001

Table 4.2 (continued) Comparison Of Secondary Water Quality Parameters					
Parameter	Units	Lake 93-13 (1)			Sakoonang Channel (2)
		Average (3)	Median	Range	06/01/99
Secondary Contaminants					
Aluminum	mg/L		<0.02	<0.015 - <0.02	3.11
Chloride	mg/L	28.9	27.5	27.2 – 32.1	2.61
Color	Units	10	10	10	200
Copper	mg/L	<0.003	<0.003	<0.003	0.008
Langelier Index (Corrosivity)	(Unit)	-1.2	-1.3	(-1.8) – (-0.4)	-2.0
Fluoride	mg/L	0.25	<0.06	<0.06 – 0.70	<0.06
Foaming agents	mg/L	<0.10	<0.10	<0.10	<0.10
Iron	mg/L	0.086	0.086	0.083 – 0.089	5.08
Manganese	mg/L	0.013	0.010	0.008 – 0.022	0.121
Odor (4)	TON	2	2	2	2
PH		7.6	7.7	7.3 – 7.7	7.3
Silver	mg/L	0.00007	<0.0001	<0.0001 – 0.0001	0.0001
Sodium	mg/L	14.1	14.3	13.4 – 14.5	2.9
Sulfate	mg/L	2.8	2.9	2.6 – 3.0	5.5
Total Dissolved Solids	mg/L	93	90	76 – 112	54
Zinc	mg/L	0.068	0.045	<0.003 – 0.156	<0.02
General Water Quality Parameters					
Calcium	mg/L	8.93	9.25	8.19 – 9.35	7.92
Alkalinity as CaCO3	mg/L	31	30	30 – 34	21
Hardness as CaCO3	mg/L	40.1	41.5	36.3 – 42.6	N/A
Magnesium	mg/L	3.05	4.4	<0.045 – 4.74	N/A
Volatile Organic Chemical Analysis (5)					
Ethylbenzene	mg/L	<0.00020	<0.00020	<0.00020	<0.00020
Toluene	mg/L	0.00021	<0.00020	<0.00020 – 0.00042	<0.00020
Total Xylene	mg/L	<0.00020	<0.00020	<0.00020	<0.00020
1,2,4-Trimethylbenzene	mg/L	<0.00020	<0.00020	<0.00020	<0.00020
1,3,5-Trimethylbenzene	mg/L	<0.00020	<0.00020	<0.00020	<0.00020

Table 4.2 (continued) Comparison Of Secondary Water Quality Parameters					
Parameter	Units	Lake 93-13 (1)			Sakoonang Channel (2)
		Average (3)	Median	Range	06/01/99
Total Trihalomethanes					
Total Trihalomethanes	mg/L	<0.00050	<0.00050	<0.00050	<0.00050
Radioactive Contaminants					
Gross Alpha Radioactivity (6)	pCi/L	ND@1+/-0.42	ND@1+/-0.42	ND@1+/-0.42	1.89+/-0.71
Total Coliform Bacteria					
Total Coliform By Colilert		(7)	(7)	Not Detected/ Detected	Detected
Fecal Coliform By Colilert		Not Detected	Not Detected	Not Detected	Detected

Notes:

1. The Average, Median and Range for Lake 93-13 were based on data obtained on 17 July, 18 August and 16 September 1998, except for gross alpha radiation, which is based only on 9 June 1998 data, and total Coliform Bacteria, which is based on 18 August and 16 September 1998 data.
2. Data for the Sakoonang Channel were collected on 1 June 1999.
3. For parameters with values below the method detection limit, the average was calculated by replacing the less than detection limit value with a value equal to one-half the method detection limit.
4. TON - Threshold Odor Number.
5. For Volatile Organic Chemical Analysis, only the parameters with values above the method detection limit during July, August or September are presented in the table above. Other Volatile Organics examined include: benzene, bromobenzene, bromochloromethane, bromodichloromethane, bromoform, bromomethane, n-butylbenzene, sec-butylbenzene, tert-butylbenzene, carbon tetrachloride, chlorobenzene (monochlorobenzene), chloroethane, chloroform, chloromethane, 2-chlorotoluene, 4-chlorotoluene, dibromochloromethane, dibromomethane, 1,2-dichlorobenzene (o-dichlorobenzene), 1,3-dichloro- benzene, 1,4-dichlorobenzene (para-dichlorobenzene), dichlorodifluoromethane, 1,1-dichloroethane, 1,2-dichloroethane, 1,1-dichloroethene, cis-1,2-dichloroethene, trans-1,2-dichloroethene, 1,2-dichloropropane,1,3-dichloropropane, 2,2-dichloropropane, 1,1-dichloropropene, cis-1,3-dichloro- propene, trans-1,3-dichloropropene, hexachlorobutadiene, isopropylbenzene, p-isopropyltoluene, methylene chloride (dichloromethane), naphthalene, n-propylbenzene, styrene, 1,1,1,2-tetrachloroethane, 1,1,2,2-tetrachloroethane, tetrachloroethene, 1,2,3-trichlorobenzene, 1,2,4-trichlorobenzene, 1,1,1-trichloroethane, 1,1,2-trichloroethane, trichloroethene, trichlorofluoromethane, 1,2,3-trichloropropane, vinyl chloride, 4-bromofluorobenzene (BFB (Surr)), and 1,2-dichlorobenzene-d4 (1,2-DCB-d4 (Surr)). Laboratory results can be found in Appendix F.
6. The Gross Alpha Radioactivity is a statistical analysis and is reported as the mean value of the sample and the standard deviation.
7. Total coliform by colilert was not detected on 16 September 1998 but was detected on 18 August 1998.

5.0 Other Methods Of Lake Recharge

5.1 Snow Fences

Snow fences provide a potential solution to enhance the water recharge of Lakes 93-12 and 93-13. They have been used in Alaska for both water augmentation and drift control. Water accumulation data are available for two snow fences constructed on the North Slope of Alaska: one at Barrow and one at Wainwright. The water yield per lineal foot of fence and the height of the fence associated with the two sites is presented in Table 5.1.

Table 5.1 Representative Snow Fence Water Volume Yield

Location	Yield (gallons per lineal foot)	Height of Fence (feet)
Barrow, Alaska	8,300	4
Wainwright, Alaska	11,800	8

(Smith, D.W., 1996)

The data suggests that snow fences could provide a significant portion, if not all the water required by the Alpine facility. For example: a 1200-foot snow fence with operational properties similar to the fence in Barrow might yield an additional 10-MG of water; and a snow fence with similar properties to the Wainwright fence might yield an additional 14-MG. Both of these fences would provide Alpine's entire estimated annual water requirement of 10 MG for the years 2005 and 2006.

The amount of water produced by a snow fence will vary from one location to another and from one year to the next as wind and precipitation conditions vary. Factors such as wind direction, wind velocity, topography, fence height, and fence design will affect the efficiency with which the fence catches blowing snow. It should be noted that additional snow accumulation as a result of the snow fence might lengthen the time the lake is ice-covered and thus effect water quality and fish populations. Snow fences are a viable option to increase water supply, but will require a site-specific assessment to estimate the magnitude of increase in attainable water and to assess potential environmental impacts.

5.2 Additional Fresh Water Sources

The recharge of Lakes 93-12 and 93-13 might be accomplished by transferring water from other nearby fresh water lakes. Potential lakes include 93-10 and 93-11, two lakes located east of 93-12.

Transferring water from additional fresh water lakes might offer Alpine greater flexibility than pumping from the Sakoonang Channel. Lake pumping can occur anytime over the summer months. Pumps and piping may be sized smaller and the water transfer can take place after the lake surfaces are ice-free. By comparison, water transfers from the Sakoonang Channel will be constrained to approximately a 20-day window during breakup when Lakes 93-12 and 93-13 are likely to be ice-covered. Additionally, the water quality in the nearby fresh water lakes is likely to more closely match the water quality in Lakes 93-12 and 93-13 than the water from the Sakoonang Channel.

The challenge associated with pumping from other nearby lakes may be finding a lake or lakes with a sufficient quantity of water to meet shortfalls in Lakes 93-12 and 93-13 if there are a number of consecutive years without natural recharge. The two lakes mentioned above have depths similar to Lakes 93-12 and 93-13, but are considerably smaller in surface area. Lake 93-10 has a reported depth of 14.5 feet and a water surface area of 61 acres (Moulton, 1997). Lake 93-11 has a reported depth of 12.5 feet and a water surface area of 22 acres (Moulton, 1997). Lakes 93-12 and 93-13 have surface areas of 100 and 69 acres, respectively. To assess the potential of nearby lakes to practically meet the shortfall likely to occur in Lakes 93-12 and 93-13, the water balance described in Section 3 should be enlarged to consider the water likely to be available from specific nearby lakes. The assessment would consider the estimated annual shortfall in Lakes 93-12 and 93-13, the amount of the allowable withdrawal from selected nearby lakes, and the available water in nearby lakes as a result of year to year variations in precipitation, evaporation, and flooding by the river.

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APPENDIX A

LOCATION MAP

LIST OF FIGURES

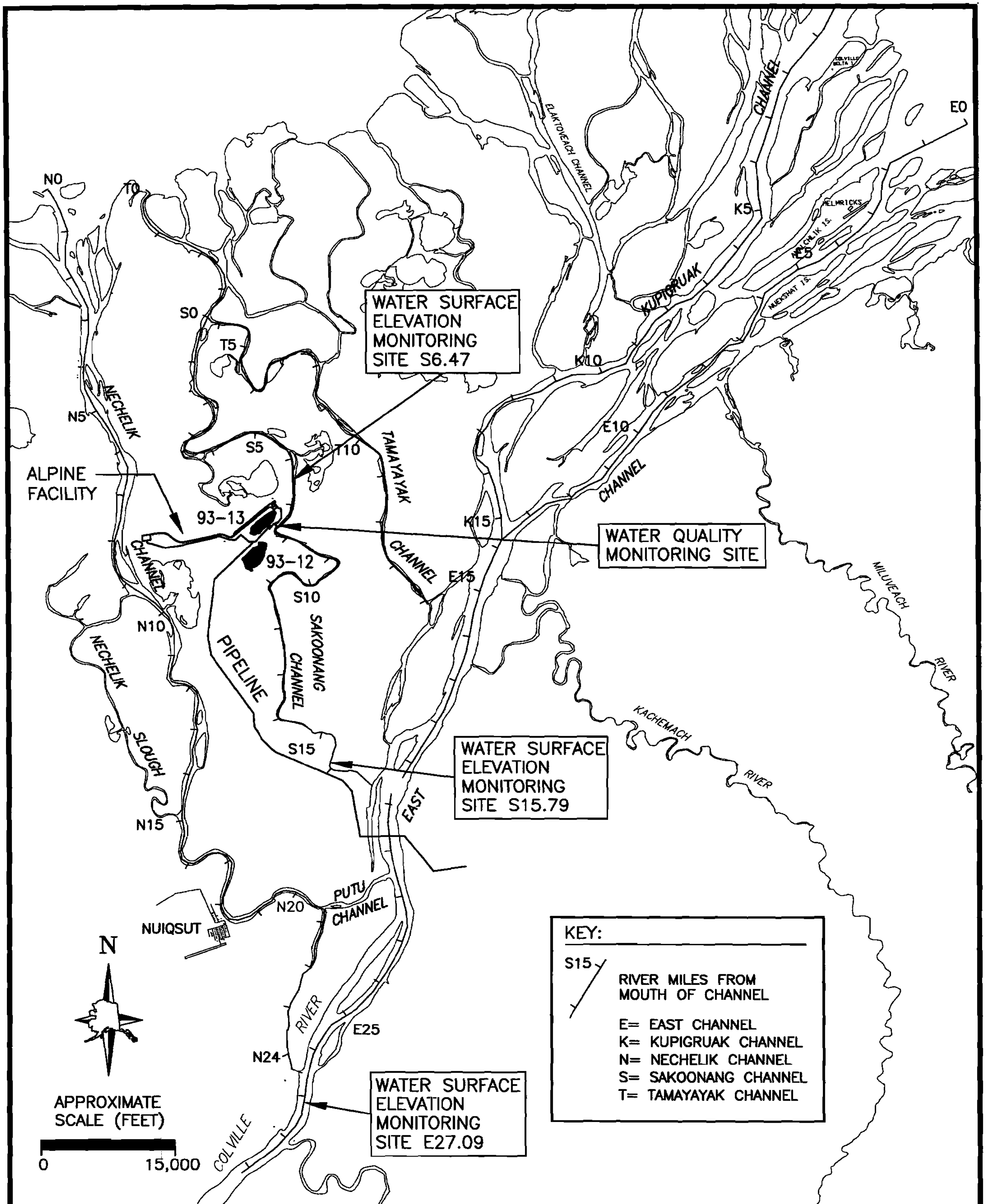

FIGURE: 1	Baker — Michael Baker Jr., Inc.	ALPINE DEVELOPMENT WATER SUPPLY 1999 MONITORING AND ASSESSMENT
	DATE: 5/4/00 — PROJECT: 23100 DRAWN: BC — FILE: Monitor99Loc.DWG CHECKED: JWA — SCALE: 1 INCH= 15,000 FT	LOCATION MAP

APPENDIX B

LAKE 93-12 AND LAKE 93-13 1999 MONITORING DATA AND 1998 WATER QUALITY DATA

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Methods

Water Level Monitoring

A staff gage was established in each lake and read periodically throughout the spring and summer. The height of the water on the staff gage was correlated to British Petroleum Mean Sea Level (BPMSL) and thus, all of the water surface elevations reported herein are based on BPMSL.

Water Quality Measurements

Salinity, Conductivity, Temperature, Dissolved Oxygen

Salinity, conductivity, and temperature were measured with a YSI Model 30 SCT meter. Dissolved oxygen and temperature were measured with a YSI Model 95 Dissolved Oxygen Meter.

Prior to making the measurements, the depth of water was measured and used to determine the measurement interval. Measurements were made at one-foot intervals from the bottom of the lake to the surface, with no measurements being made within one foot of the surface. For instance, if the lake was 9.6 feet deep, measurements were made at 8.6, 7.6, 6.6, 5.6, 4.6, 3.6, 2.6, and 1.6 feet from the water surface. To make the measurements, the probe to be used in making the measurement was attached to a weighted tape measure and lowered to the appropriate depth. Measurements were only recorded after the readings stabilized.

Turbidity

Turbidity was measured using a Hoch model 2100P Turbidimeter. Samples for turbidity measurement were obtained using one of two methods. The first method consisted of using a US D-74 depth-integrating sampler to collect a single sample representing the entire water column (i.e., from surface to 6 inches above the lakebed). The second method consisted of collecting discrete samples using a bailer. The lowest sample was collected 3 feet above the lakebed and additional samples were collected at three-foot intervals above the lowest sample. When discrete samples were taken, the turbidity was measured in each of the discrete samples.

Total Suspended Solids

A depth-integrated water sample was collected using a US D-74 depth-integrating sampler and the sample shipped to Northern Testing Laboratories for analysis.

Results

A summary of the 1999 water surface elevations and observations recorded on Lake 93-12 is presented in Table B-1. A summary of the water temperature, salinity, conductivity, dissolved oxygen, turbidity, and total suspended solids data collected in 1999 is presented in Table B-2. Plots of the various parameters versus water depth are presented in Figures B-2a, B-2b, B-2c, B-2d, and B-2e. A summary of the primary inorganic chemicals, secondary contaminates, hardness, volatile organic chemicals, trihalomethanes, radioactive contaminants, and total coliform bacteria collected in 1998 by others, is presented in Table B-3.

A summary of the 1999 water surface elevations and observations recorded on Lake 93-13 is presented in Table B-4. A summary of the water temperature, salinity, conductivity, dissolved oxygen, turbidity, and total suspended solids data collected in 1999 is presented in Table B-5. Plots of the various parameters versus depth are presented in Figures B-5a, B-5b, B-5c, B-5d, and B-5e. A summary of the primary inorganic chemicals, secondary contaminates, hardness, volatile organic chemicals, trihalomethanes, radioactive contaminants, and total coliform bacteria collected in 1998 by others, is presented in Table B-6.

Table B-1: Lake 93-12 1999 Water Surface Elevations And Observations

Date	Time	Water Surface Elevation (feet)	Observations
4/28/99		7.45	
6/10/99	12:43	7.77	
6/14/99	9:40	7.93	Approximately 90% ice coverage, ice along shoreline has melted
6/18/99	12:00	7.93	Approximately 85% ice coverage. Wide leads have opened along the east shore. Area surrounding the staff gauge has opened up considerably, approximately 30 - 40 feet open along the shoreline. Elsewhere along the perimeter, ice cover remains closer to shore, approximately 5 - 10 feet.
6/22/99	15:00	7.93	Ice coverage is approximately 80%.
6/24/99		7.92	Ice coverage is approximately 70%.
7/7/99	10:00	7.87	Lake is ice free.
7/11/99	11:30	7.84	+/- 0.02 ft
7/14/99	16:50	7.83	+/- 0.01 ft.
	19:30	7.82	+/- 0.02 ft.
7/19/99		7.84	Rain has fallen during the previous days.
7/22/99		7.83	Rain continues to fall.
7/27/99		7.61	Calm
7/29/99		7.78	
8/2/99	17:00	7.75	Moderate wave action.
8/15/99		7.80	Rainy.
8/25/99	9:28	7.74	+/- 0.03 ft.
9/8/99	15:56	7.24	+/- 0.35 ft. Heavy wave action. Wind from the northeast.
9/21/99	16:01	7.74	+/- 0.10 ft.
	16:41	7.72	+/- 0.10 ft.
9/25/99	18:15	7.74	No wave action. Ice was built up on staff gage, although there was no apparent ice in the lake. Pulled staff gage after taking reading. Left angle iron.

Notes:
1. Water surface elevations are based on Alpine Monument 4 and TBM 993259.
2. TBM 993259 has the following coordinates, N 70° 20' 00.7" W 150° 56' 48.9" (NAD27), and an elevation of 14.62 (established in 1999).
3. Alpine Monument 4 has the following coordinates, N 70° 20' 22.7" W 150° 55' 49.8" (NAD27), and an elevation of 12.36 (established in 1998).

Table B-2: Lake 93-12 1999 Primary Water Quality Parameters

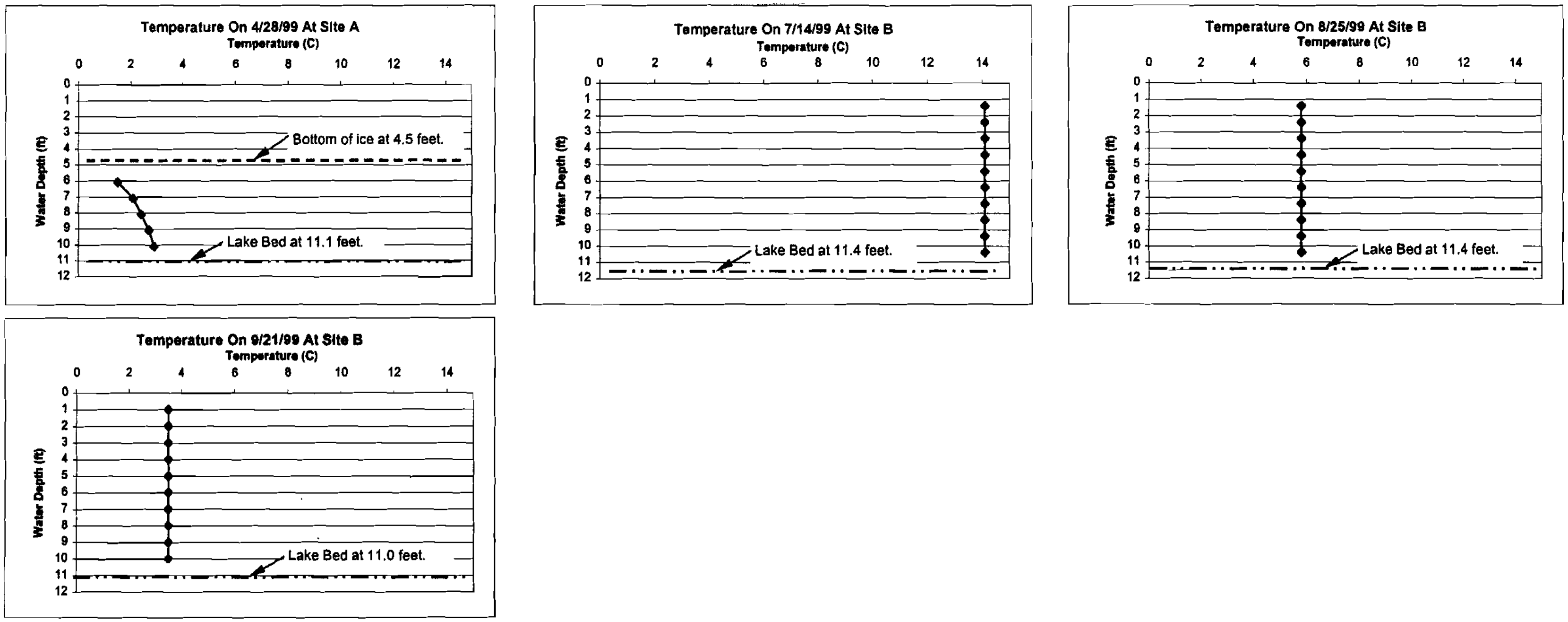
Date	Location	Water Surface Elevation (feet)	Sample Depth (ft)	Water Temp (3) (C)	Salinity (ppt)	Conduct-ivity (µS)	Dissolved Oxygen (mg/L)	Turbidity (NTU)	Total Suspended Solids (mg/L)
4/28/99	Site A	7.45	6.1	1.5	0.1		13.2		
(1)	N 70° 20' 00.7"		7.1	2.1	0.1		13.2		
	W 150° 56' 48.9"		8.1	2.4	0.1		14.0	2.3	
	(NAD27)		9.1	2.7	0.1		12.8		
			10.1	2.9	0.1		10.1		
			11.1	Lake Bed					
7/14/99	Site B	7.82	1.4	14.1	0.0	63.8	10.66		
(2)	N 70° 20' 01.2"		2.4	14.1	0.0	63.9	10.65	1.6	
	W 150° 56' 45.8"		3.4	14.1	0.0	63.9	10.66		
	(NAD27)		4.4	14.1	0.0	63.8	10.63		
			5.4	14.1	0.0	63.9	10.65	1.3	
			6.4	14.1	0.0	64.0	10.65		
			7.4	14.1	0.0	63.9	10.66		
			8.4	14.1	0.0	63.9	10.66	1.4	
			9.4	14.1	0.0	63.9	10.71		
			10.4	14.1	0.0	64.0	10.61		
			11.4	River Bed					
			Depth Integrated 0 - 11.4 feet						12
8/25/99	Site B	7.74	1.4	5.8	0.0	51.7	12.22		
(2)	N 70° 20' 01.2"		2.4	5.8	0.0	51.7	12.43	1.9	
	W 150° 56' 45.8"		3.4	5.8	0.0	51.7	12.32		
	(NAD27)		4.4	5.8	0.0	51.7	12.27		
			5.4	5.8	0.0	51.7	12.26	1.7	
			6.4	5.8	0.0	51.7	12.23		
			7.4	5.8	0.0	51.7	12.26		
			8.4	5.8	0.0	51.7	12.22	1.3	
			9.4	5.8	0.0	51.7	12.18		
			10.4	5.8	0.0	51.7	12.25		
			11.4	River Bed					
			Depth Integrated 0 - 11.4 feet					2.7	1.5
9/21/99	Site B	7.74	1.0	3.5	0.0	49.0	13.30		
(2)	N 70° 20' 01.2"		2.0	3.5	0.0	49.0	13.30	0.65	
	W 150° 56' 45.8"		3.0	3.5	0.0	48.9	13.27		
	(NAD27)		4.0	3.5	0.0	48.9	13.29		
			5.0	3.5	0.0	49.0	13.29	1.7	
			6.0	3.5	0.0	48.8	13.30		
			7.0	3.5	0.0	48.8	13.29		
			8.0	3.5	0.0	49.0	13.28	0.6	
			9.0	3.5	0.0	48.5	13.27		
			10.0	3.5	0.0	48.9	13.32		

Table B-2 (Continued): Lake 93-12 1999 Primary Water Quality Parameters

Date	Location	Water Surface Elevation (feet)	Sample Depth (ft)	Water Temp (3) (C)	Salinity (ppt)	Conduct-ivity (µS)	Dissolved Oxygen (mg/L)	Turbidity (NTU)	Total Suspended Solids (mg/L)
9/21/99	continued		11.0	River Bed					
			Depth Integrated 0 - 11.0 feet					1.3	<MRL

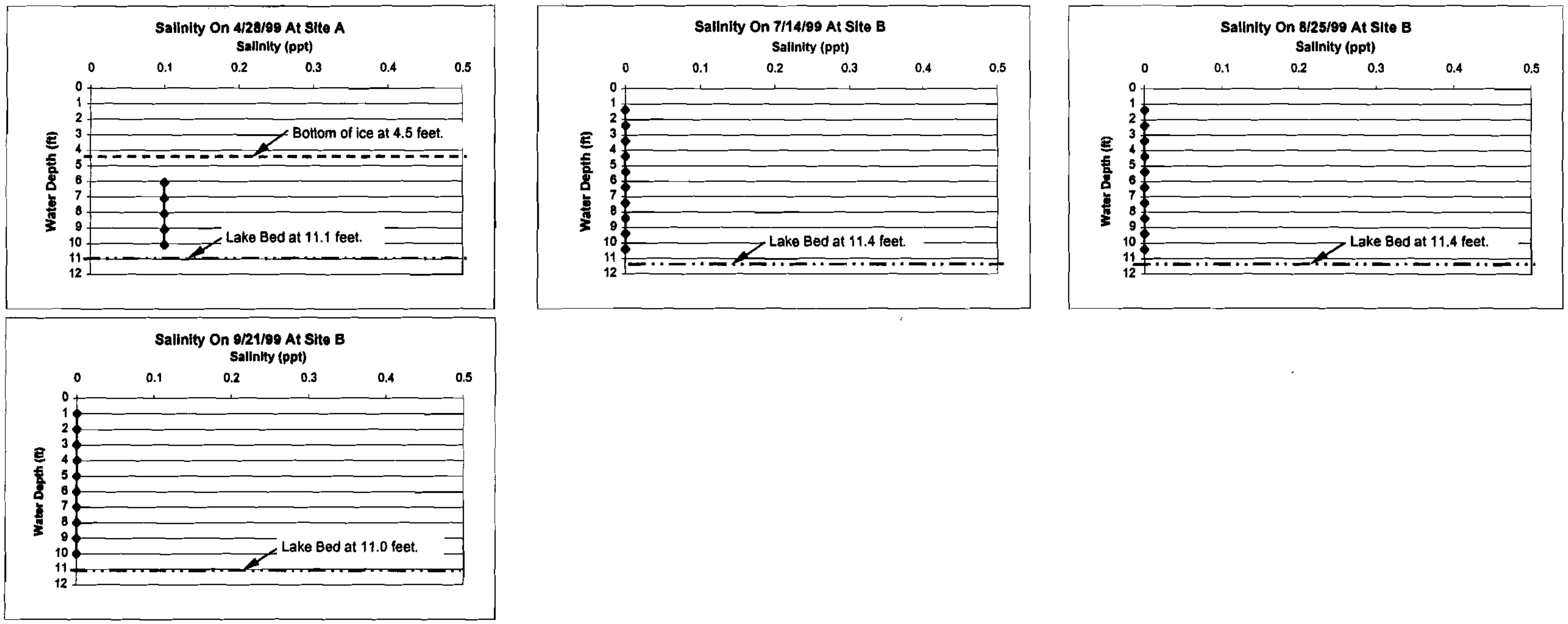
Notes:
1. On this date the lake was covered with ice. The ice thickness was 4.5 feet and the distance from the top of the ice to the water surface was 0.1 feet.
2. Site originally sampled on 4/28/99. Buoy left at site for future reference.
3. The temperature is the average temperature from the DO meter and the SCT meter. The difference between the temperatures was generally within the accuracy of the instruments.
4. MRL = Method Reporting Limit (1.1 mg/L)

Figure B-2a: Lake 93-12 1999 Water Temperature Versus Depth



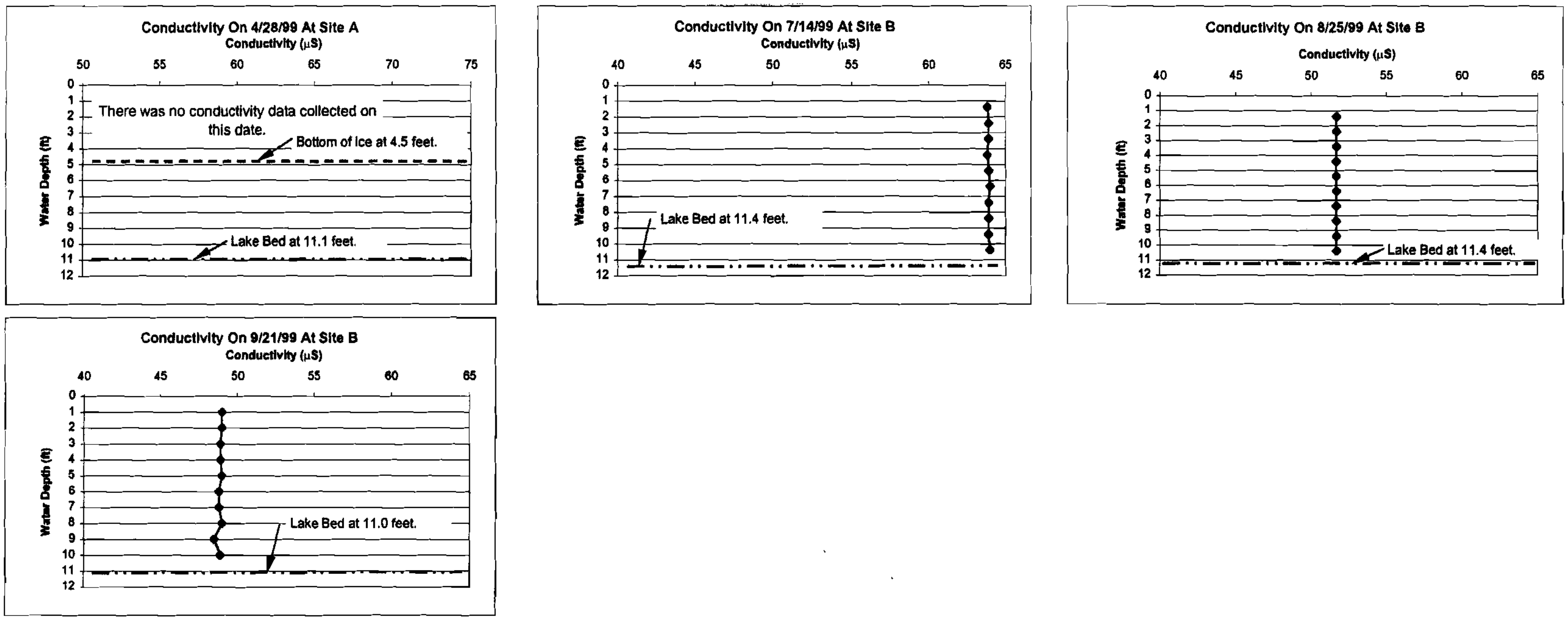
Note: See Table B-2 for site locations.

Figure B-2b: Lake 93-12 1999 Salinity Versus Depth



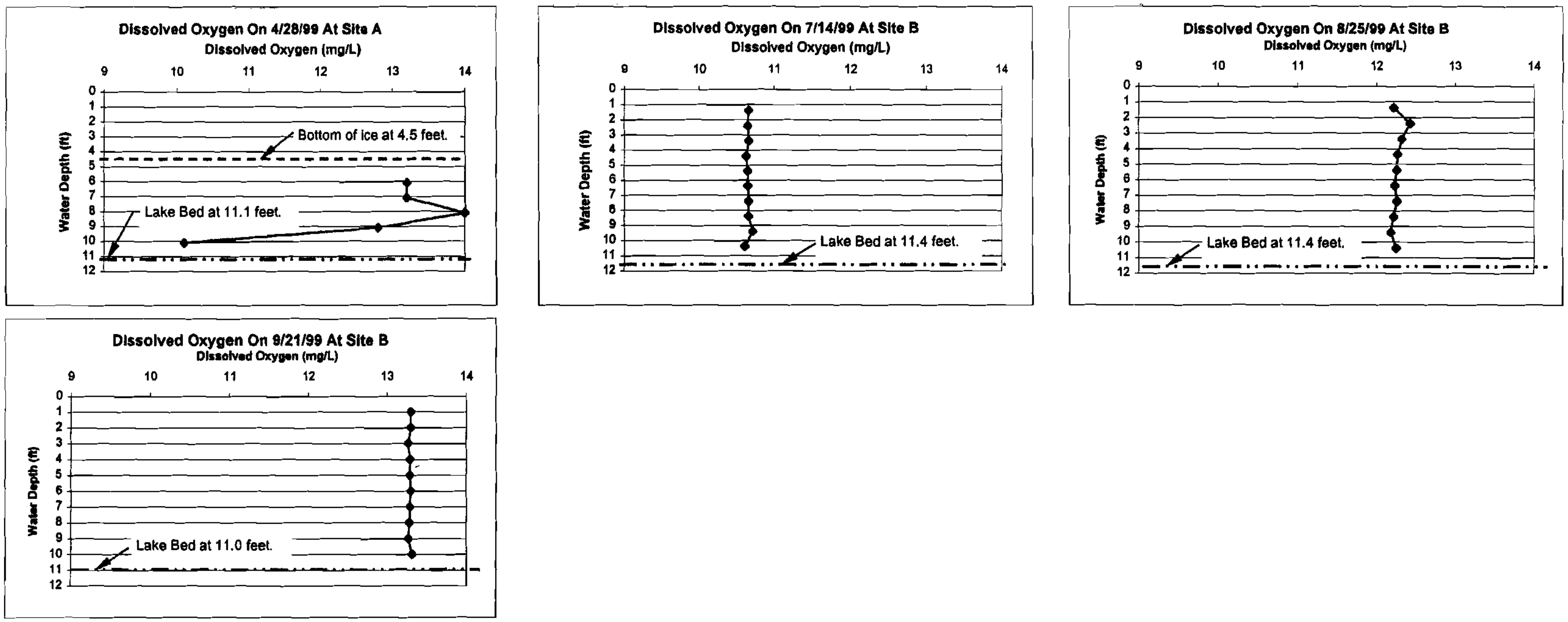
Note: See Table B-2 for site locations.

Figure B-2c: Lake 93-12 1999 Conductivity Versus Depth



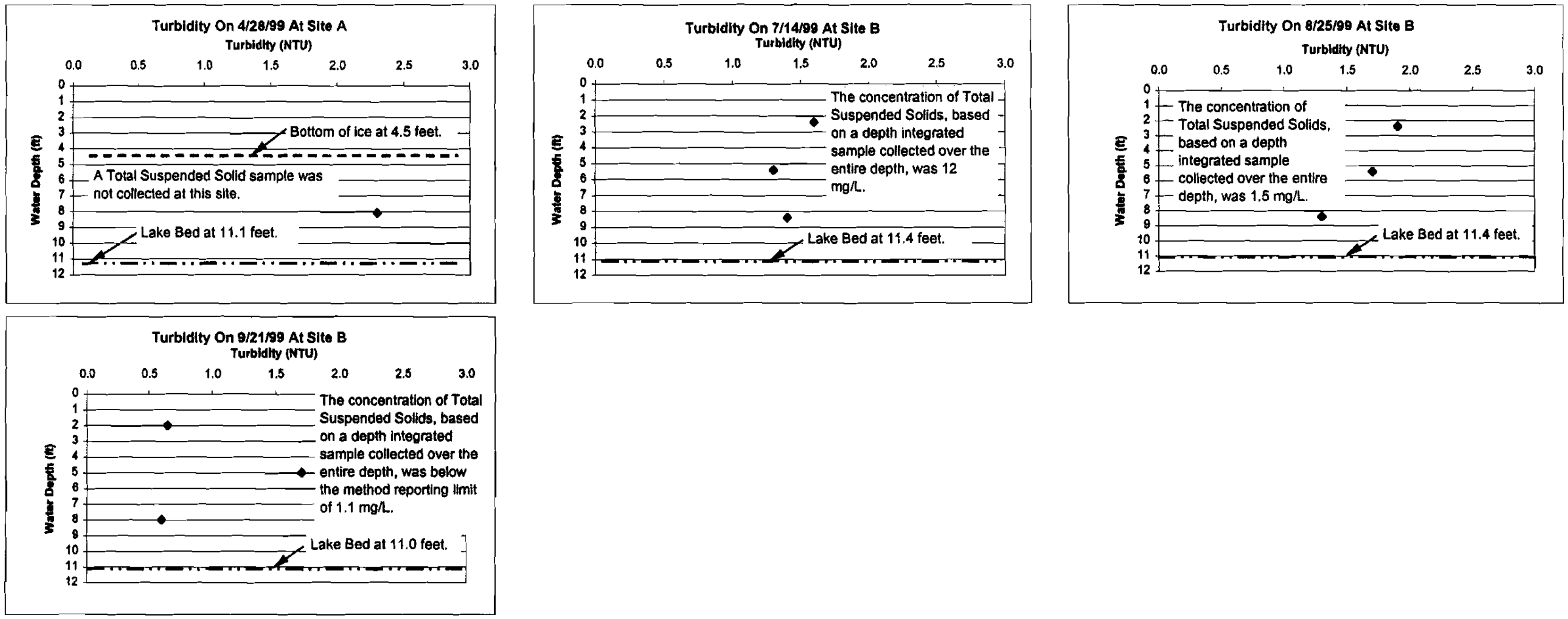
Note: See Table B-2 for site locations.

Figure B-2d: Lake 93-12 1999 Dissolved Oxygen Versus Depth



Note: See Table B-2 for site locations.

Figure B-2e: Lake L93-12 1999 Turbidity Versus Depth



Note: See Table B-2 for site location.

Table B-3: Lake 93-12 1998 Secondary Water Quality Parameters

Parameter	Units	ADEC Drinking Water Maximum Contaminant Level (1)	Sampling Date Results (2)					
			2/1/98	3/13/98	3/27/98	4/12/98	4/26/98	5/11/98
Primary Inorganic Chemicals								
Antimony	mg/L	0.006	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Arsenic	mg/L	0.05	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Barium	mg/L	2	0.092	0.12	0.106	0.129	0.134	0.126
Beryllium	mg/L	0.004	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Cadmium	mg/L	0.005	<0.0001	<0.0001	0.0001	<0.0001	<0.0001	0.0001
Chromium	mg/L	0.1	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Cyanide	mg/L	0.2	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Fluoride	mg/L	4.0	<0.04	0.04	<0.04	0.12	0.05	0.06
Mercury	mg/L	0.002	0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Nickel	mg/L	0.1	<0.028	<0.028	<0.028	<0.028	<0.028	<0.028
Nitrate	mg/L	10	0.08	0.06	0.05	<0.03	<0.03	<0.03
Selenium	mg/L	0.05	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Thallium	mg/L	0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Secondary Contaminants								
Aluminum	mg/L	0.2	<0.055	<0.055	<0.055	<0.055	<0.055	<0.055
Chloride	mg/L	250	14.3	17	21.9	21.1	18.1	17
Color	Units	15	<5	10	10	10	10	10
Copper	mg/L	1.0	<0.005	<0.005	<0.005	<0.005	0.008	<0.008
Langelier Index (Corrosivity)	(Unit)	Noncorrosive	-1.6	-1.6	-1.6	-0.7	-1.6	-0.8
Fluoride	mg/L	2.0	<0.04	0.04	<0.04	0.12	0.05	0.06
Foaming agents	mg/L	0.5	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Iron	mg/L	0.3	0.012	0.054	0.078	0.099	0.247	0.064
Manganese	mg/L	0.05	0.056	0.005	0.009	0.007	0.047	0.019
Odor (3)	TON	3	8	2	1	2	8	2
pH		6.5 - 8.5	7.2	7.0	7.1	7.9	7.0	7.8
Silver	mg/L	0.1	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Sodium	mg/L	250	7.45	9.42	8.95	9.87	9.88	9.78
Sulfate	mg/L	250	<0.20	0.30	<0.20	<0.20	0.46	0.25
Total Dissolved Solids	mg/L	500	54	115	87	85	108	85
Zinc	mg/L	5	<0.008	0.013	<0.008	0.011	<0.008	<0.008

Table B-3 (Continued): Lake 93-12 1998 Secondary Water Quality Parameters

Parameter	Units	ADEC Drinking Water Maximum Contaminant Level (1)	Sampling Date Results (2)					
			2/1/98	3/13/98	3/27/98	4/12/98	4/26/98	5/11/98
Other Analyses								
Calcium	mg/L	(4)	11.2	15.1	12.1	14.5	15.3	14.5
Alkalinity as CaCO3	mg/L	(4)	44	57	51	60	62	57
Bicarbonate Alkalinity	mg/L	(4)	44	57	51	60	62	57
Hardness as CaCO3	mg/L	(4)	45.1	59.7	49.8	60.8	63.7	60.2
Magnesium	mg/L	(4)	4.16	5.36	4.73	5.94	6.2	5.83
Volatile Organic Chemical Analysis (5)								
Ethylbenzene	mg/L	0.7	<0.00020	<0.00020	0.00028	0.00088	<0.00020	<0.00020
Toluene	mg/L	1	0.00048	<0.00020	0.00083	0.0025	<0.00020	<0.00020
Total Xylene	mg/L	10	<0.00020	<0.00020	0.00135	0.00460	<0.00020	<0.00020
Bromoform	mg/L	(4)	0.00066	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Isopropylbenzene	mg/L	(4)	<0.00020	<0.00020	<0.00020	0.00026	<0.00020	<0.00020
n-Propylbenzene	mg/L	(4)	<0.00020	<0.00020	<0.00020	0.00038	<0.00020	<0.00020
1,2,4-Trimethylbenzene	mg/L	(4)	<0.00020	<0.00020	0.00029	0.00095	<0.00020	<0.00020
1,3,5-Trimethylbenzene	mg/L	(4)	<0.00020	<0.00020	0.00035	0.00112	<0.00020	<0.00020
Total Trihalomethanes								
Total Trihalomethanes	mg/L	0.10	0.00066	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Radioactive Contaminants								
Gross Alpha Radioactivity (6)	pCi/L	15	ND@1+/-0.28	ND@1+/-0.29	ND@1+/-0.31	ND@1+/-0.32	ND@1+/-0.33	ND@1+/-0.26
Total Coliform Bacteria								
Total Coliform By Colilert		Not Detected	Not Detected	Not Detected	Not Detected	N/A	Not Detected	Not Detected
Fecal Coliform By Colilert		Not Detected	Not Detected	Not Detected	Not Detected	N/A	Not Detected	Not Detected
Turbidity								
Turbidity	NTU	5	0.35	0.60	0.60	0.50	1.4	0.45

Notes:

1. Alaska Department of Environmental Conservation (ADEC) Drinking Water Maximum Contaminant Levels are listed in the Alaska Drinking Water Regulations (18 AAC 80) as amended through 1 October 1999, except for Aluminum, Foaming Agents and Silver which are from the regulations as amended through 10 November 1994.
2. Shaded areas indicate levels that do not meet the Alaska Drinking Water Regulations.

Table B-3 (Continued): Lake 93-12 1998 Secondary Water Quality Parameters

3. TON - Threshold Odor Number
4. Parameter is regulated by ADEC but a Maximum Contaminant Level is not specified.
5. Only the parameters within the Volatile Organic Group that had values above the method detection limit during February, March, April, or May are presented in the table above. Other Volatile Organics examined include: benzene, bromobenzene, bromochloromethane, bromodichloromethane, bromomethane, n-butylbenzene, sec-butylbenzene, tert-butylbenzene, carbon tetrachloride, chlorobenzene (monochlorobenzene), chloroethane, chloroform, chloromethane, 2-chlorotoluene, 4-chlorotoluene, dibromochloromethane, dibromomethane, 1,2-dichlorobenzene (o-dichlorobenzene), 1,3-dichlorobenzene 1,4-dichlorobenzene (para-dichlorobenzene), dichlorodifluoromethane, 1,1-dichloroethane, 1,2-dichloroethane, 1,1-dichloroethene, cis-1,2-dichloroethene, trans-1,2-dichloroethene, 1,2-dichloropropane,1,3-dichloropropane, 2,2-dichloropropane, 1,1-dichloropropene, cis-1,3-dichloropropene, trans-1,3-dichloropropene, hexachlorobutadiene, p-isopropyltoluene, methylene chloride (dichloromethane), naphthalene, styrene, 1,1,1,2-tetrachloroethane, 1,1,2,2-tetrachloroethane, tetrachloroethene, 1,2,3-trichlorobenzene, 1,2,4-trichlorobenzene, 1,1,1-trichloroethane, 1,1,2-trichloroethane, trichloroethene, trichlorofluoromethane, 1,2,3-trichloropropane, vinyl chloride, 4-bromofluorobenzene (BFB (Surr)), and 1,2-dichlorobenzene-d4 (1,2-DCB-d4 (Surr)). Laboratory results can be found in Appendix F.
6. The Gross Alpha Radioactivity is a statistical analysis and is reported as the mean value of the sample and the standard deviation. Additional samples were collected on 26 May and 9 June 1998. The result of the 26 May test was ND@1+/-0.38 pCi/L and the result of the 9 June test was ND@1+/-0.32 pCi/L.
7. The laboratory analyses were performed by Northern Testing Laboratories, Inc.

Table B-4: Lake 93-13 1999 Water Surface Elevations And Observations

Date	Time	Water Surface Elevation (feet)	Observations
4/27/99		5.91	Ice thickness is 4.3 feet and the distance from the top of the ice to the water surface is 0.3 feet.
6/9/99	10:17	6.14	There is still a 95% ice cover on the lake.
HWM		6.44	HWM from line on concrete blocks. +/- 0.10 ft. This could be a false line from local melt or wind. Lake was not inundated by the Sakoonang Channel this year.
6/14/99	12:00	6.11	Ice coverage is approximately 85-90%.
6/18/99	12:20	6.08	Lake has 85% ice coverage. An area of approximately 30 feet around the staff gage is clear of ice.
6/20/99	11:00	6.06	A considerable amount of the ice has melted away from the lake shore. There is approximately 100 feet or more of open water around the perimeter of the lake, near the gage.
6/24/99		6.01	Ice coverage is approximately 20 - 30%.
6/25/99	18:53	6.01	The south end of the lake has approximately 10 - 15% ice coverage.
6/28/99			Lake is ice free.
7/6/99	13:30	5.99	+/- 0.10 ft. Heavy wave action on the lake.
7/11/99	12:15	5.89	Light wind.
7/13/99	16:52	5.85	+/- 0.02 ft.
	19:11	5.84	+/- 0.02 ft.
7/14/99	10:28	5.83	+/- 0.01 ft.
7/19/99		5.84	Rain has fallen during the previous days.
7/22/99		5.91	Rain continues to fall.
7/26/99		5.81	Light wind.
7/29/99		5.77	
8/2/99	13:30	5.76	West wind, mild wave action.
8/14/99		5.74	Light wind.
8/18/99	16:30	5.73	Light wind. Moderate wave action.
8/25/99	16:00	5.71	+/- 0.02 ft.
8/26/99	13:58	5.71	+/- 0.10 ft.
9/8/99	8:30	5.67	
9/12/99	14:00	5.71	
9/20/99	16:56	5.71	+/- 0.04 ft.
	18:20	5.71	+/- 0.02 ft.

Table B-4 (Continued): Lake 93-13 1999 Water Surface Elevations And Observations

Date	Time	Water Surface Elevation (feet)	Observations
9/25/99		5.73	+/- 0.03 ft. Ice was beginning to form around the edges of the lake and on the staff gage. Staff gage was pulled after reading, but angle iron was left.

Notes:

1. Water surface elevations are based on Alpine Monument 4 and TBM 993260.
2. TBM 993260 has the following coordinates, N 70° 20' 45.1" W 150° 55' 28.6" (NAD27), and an elevation of 16.00 (established in 1999).
3. Alpine Monument 4 has the following coordinates, N 70° 20' 22.7" W 150° 55' 49.8" (NAD27), and an elevation of 12.36 (established in 1998).

Table B-5: Lake 93-13 1999 Primary Water Quality Parameters

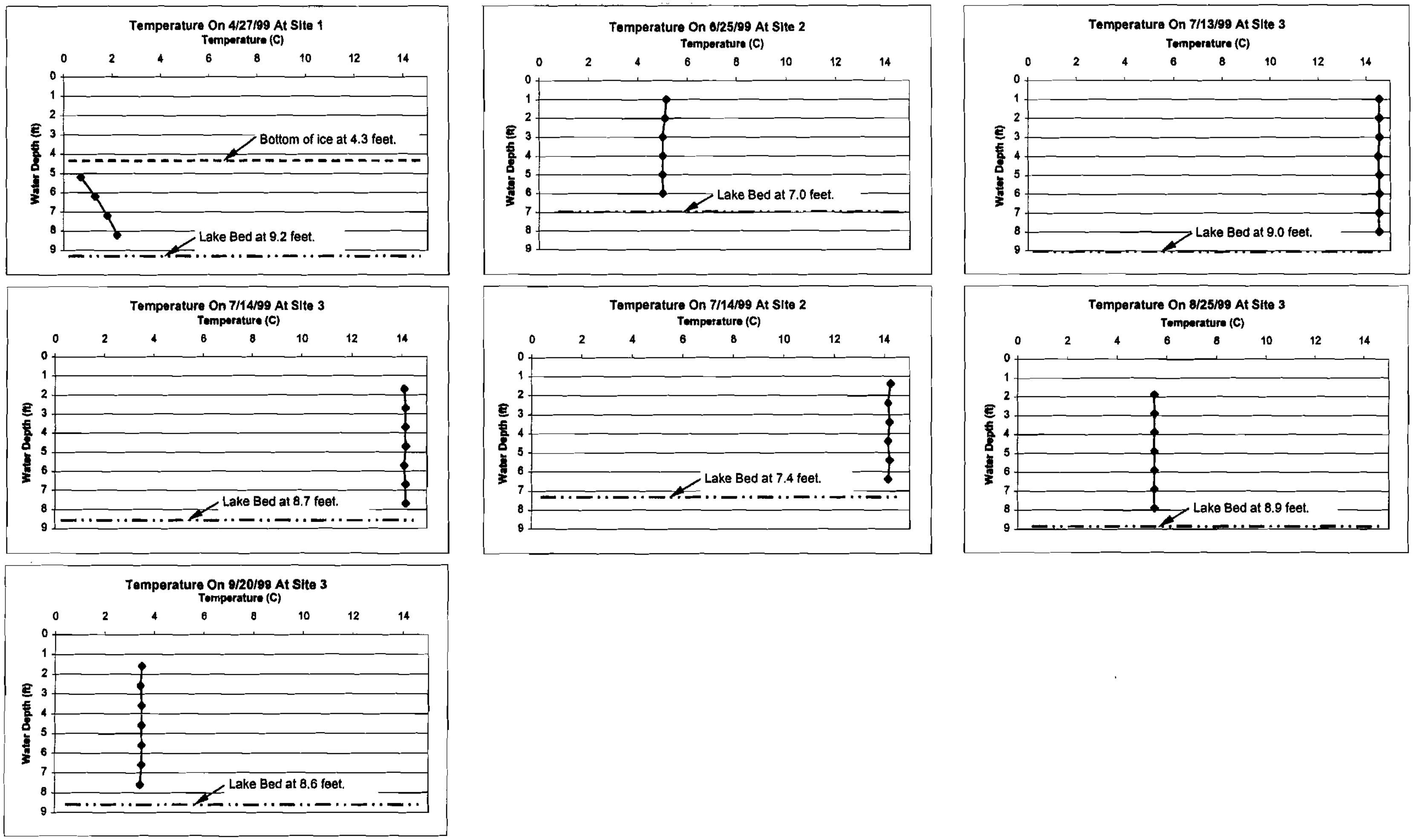
Date	Location	Water Surface Elevation (feet)	Sample Depth (ft)	Water Temp (4) (C)	Salinity (ppt)	Conduct-ivity (µS)	Dissolved Oxygen (mg/L)	Turbidity (NTU)	Total Suspended Solids (mg/L)
4/27/99	Site 1	5.91	5.2	0.7	0.2		9.7		
(1)	N 70° 20' 35.2"		6.2	1.3	0.2		8.9	2.0	
	W 150° 55' 56.0"		7.2	1.8	0.2		7.8		
	(NAD27)		8.2	2.2	0.2		8.0		
			9.2	Lake Bed					
6/25/99	Site 2	6.01	1.0	5.2	0.1	109.2	13.46		
(2)	N 70° 20' 34.4"		2.0	5.1	0.1	108.9	13.57		
	W 150° 55' 52.4"		3.0	5.0	0.1	108.9	13.61		
	(NAD27)		4.0	5.0	0.1	108.8	13.64	1.6	
			5.0	5.0	0.1	108.9	13.66		
			6.0	5.0	0.1	108.6	13.66		
			7.0	Lake Bed					
7/13/99	Site 3	5.85	1.0	14.6	0.1	138.0	11.0		
(3)	N 70° 20' 34.8"		2.0	14.6	0.1	138.0	11.0		
	W 150° 56' 00.0"		3.0	14.6	0.1	137.9	11.0	1.8	
	(NAD27)		4.0	14.5	0.1	138.5	11.0		
			5.0	14.6	0.1	138.6	11.0		
			6.0	14.6	0.1	138.5	11.0	1.5	
			7.0	14.6	0.1	138.6	11.0		
			8.0	14.6	0.1	138.6	10.9		
			9.0	Lake Bed					
7/14/99	Site 3	5.83	1.7	14.1	0.1	137.7	10.53		
(3)	N 70° 20' 34.8"		2.7	14.2	0.1	137.7	10.56	1.1	
	W 150° 56' 00.0"		3.7	14.2	0.1	137.7	10.53		
	(NAD27)		4.7	14.2	0.1	137.7	10.54		
			5.7	14.1	0.1	137.7	10.55	1.2	
			6.7	14.2	0.1	137.7	10.57		
			7.7	14.2	0.1	137.7	10.57		
			8.7	Lake Bed					
			Depth Integrated 0 - 8.7 feet						
7/14/99	Site 2	5.83	1.4	14.3	0.1	137.9	10.52		
(2)	N 70° 20' 34.4"		2.4	14.2	0.1	137.9	10.53		
	W 150° 55' 52.4"		3.4	14.2	0.1	137.8	10.50		
	(NAD27)		4.4	14.2	0.1	137.8	10.48	1.3	
			5.4	14.2	0.1	137.7	10.50		
			6.4	14.2	0.1	137.8	10.50		
			7.4	Lake Bed					
			Depth Integrated 0 - 7.4 feet						14

Table B-5 (Continued): Lake 93-13 1999 Primary Water Quality Parameters

Date	Location	Water Surface Elevation (feet)	Sample Depth (ft)	Water Temp (4) (C)	Salinity (ppt)	Conduct-ivity (µS)	Dissolved Oxygen (mg/L)	Turbidity (NTU)	Total Suspended Solids (mg/L)
8/25/99	Site 3	5.71	1.9	5.5	0.1	114.7	12.62		
(3)	N 70° 20' 34.8"		2.9	5.5	0.1	114.4	12.51	1.4	
	W 150° 56' 00.0"		3.9	5.5	0.1	114.5	12.48		
	(NAD27)		4.9	5.5	0.1	114.6	12.52		
			5.9	5.5	0.1	114.5	12.47	1.3	
			6.9	5.5	0.1	114.0	12.46		
			7.9	5.5	0.1	114.5	12.48		
			8.9	Lake Bed					
			Depth Integrated 0 - 8.9 feet					5.2	9.2
9/20/99	Site 3		1.6	3.5	0.1	111.5	13.38		
(3)	N 70° 20' 34.8"		2.6	3.5	0.1	111.3	13.39	0.55	
	W 150° 56' 00.0"		3.6	3.5	0.1	111.2	13.37		
	(NAD27)		4.6	3.5	0.1	111.2	13.36		
			5.6	3.5	0.1	111.2	13.36	1.1	
			6.6	3.5	0.1	111.2	13.35		
			7.6	3.5	0.1	111.2	13.34		
			8.6	Lake Bed					
			Depth Integrated 0 - 8.6 feet					2.1	2.9

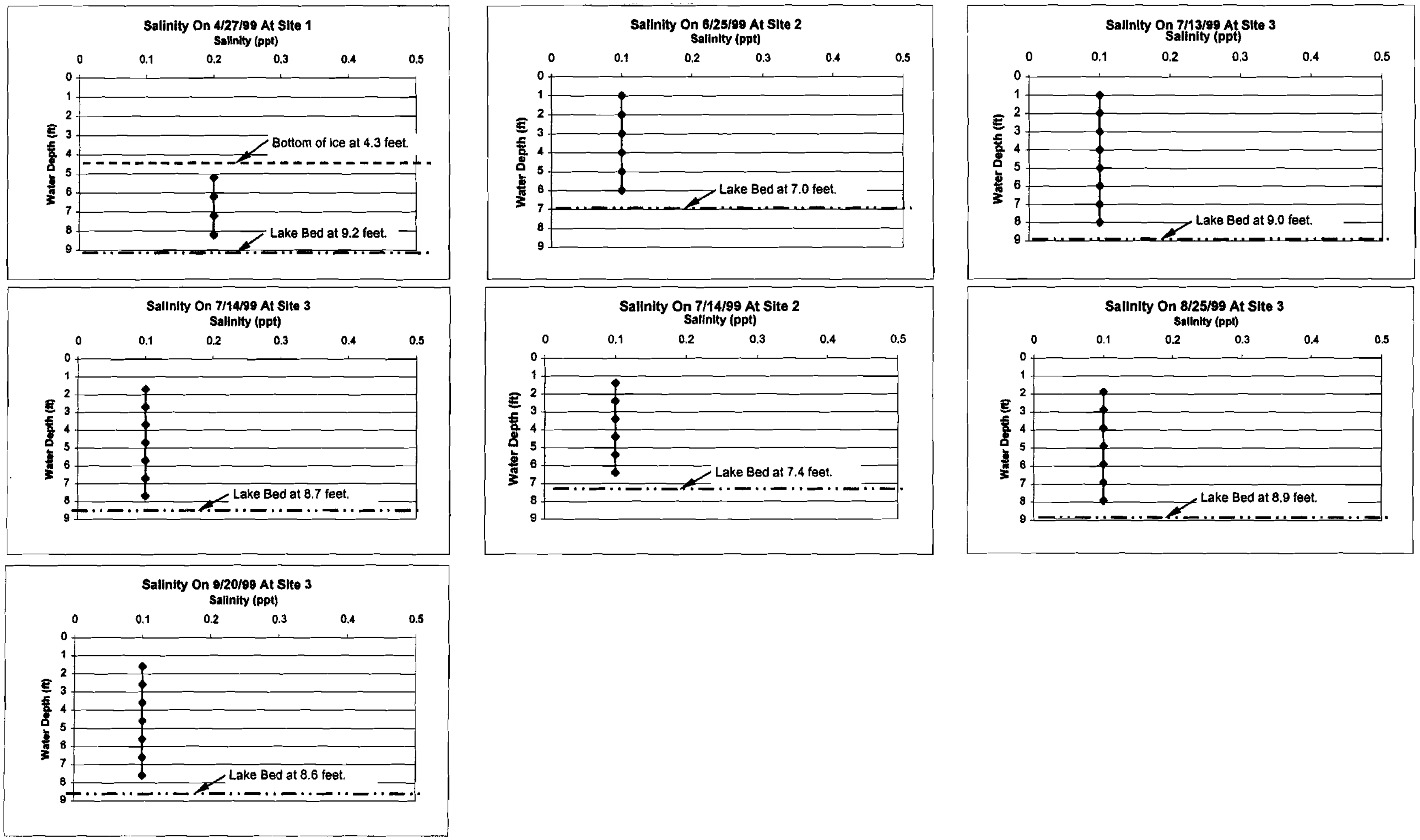
Notes:
1. On this date the lake was covered with ice. The ice thickness was 4.3 feet and the distance from the top of the ice to the water surface was 0.3 feet.
2. Site originally sampled on 6/25/99.
3. Site originally sampled on 7/13/99. Buoy left at site for future reference.
4. The temperature is the average temperature from the DO meter and the SCT meter. The difference between the temperatures was generally within the accuracy of the instruments.

Figure B-5a: Lake 93-13 1999 Water Temperature Versus Depth



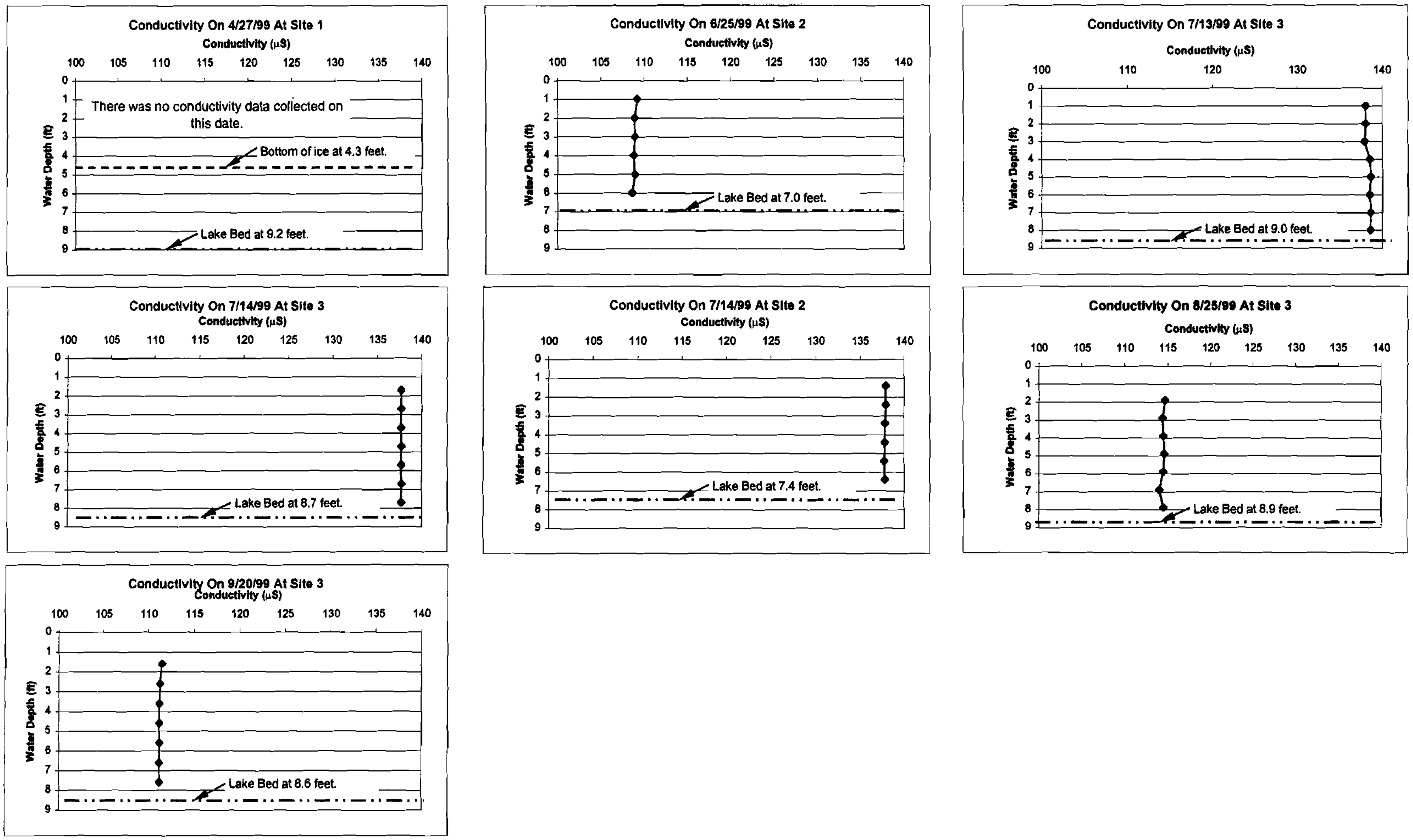
Note: See Table B-5 for locations.

Figure B-5b: Lake 93-13 1999 Salinity Versus Depth



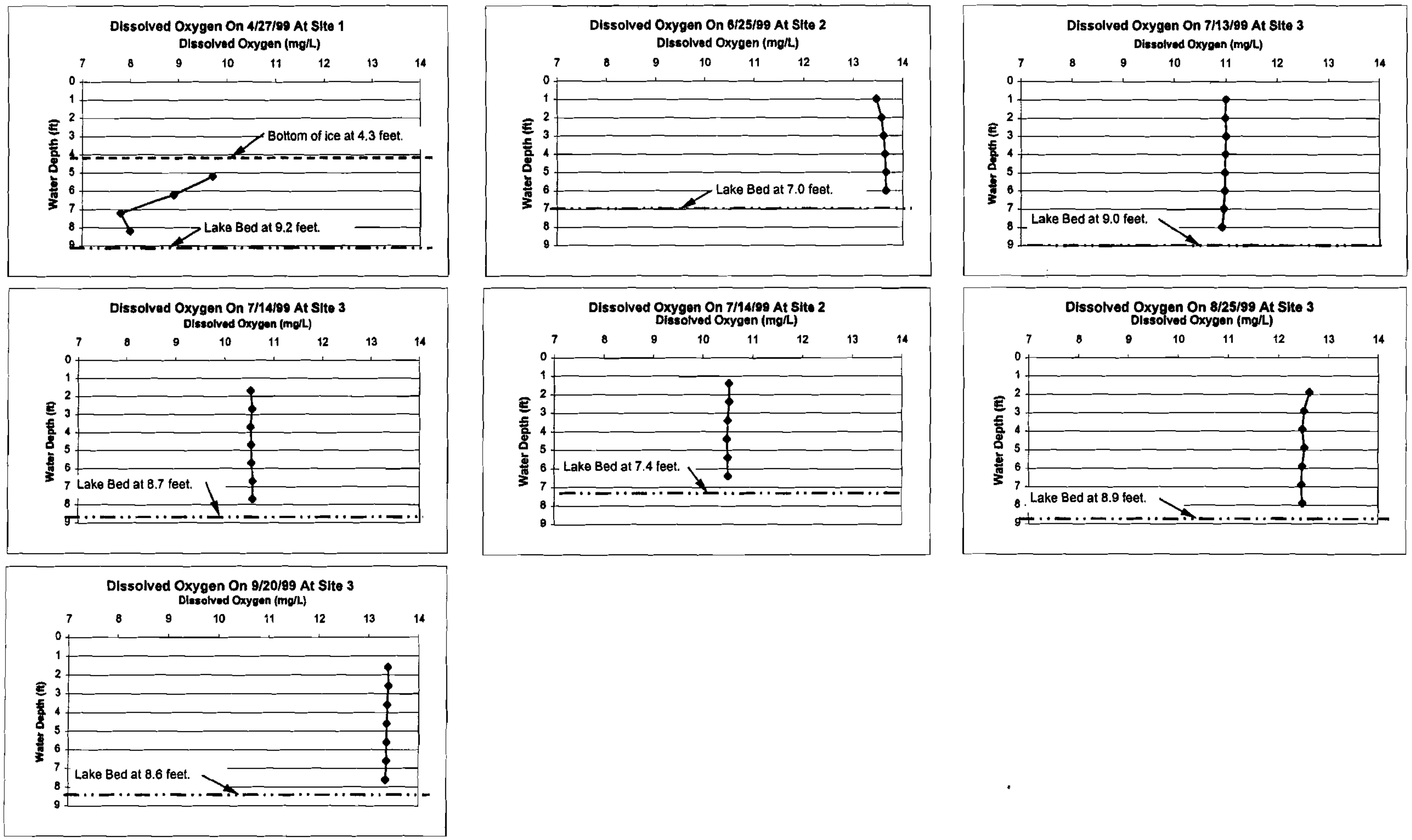
Note: See Table B-5 for site locations.

Figure B-5c: Lake 93-13 1999 Conductivity Versus Depth



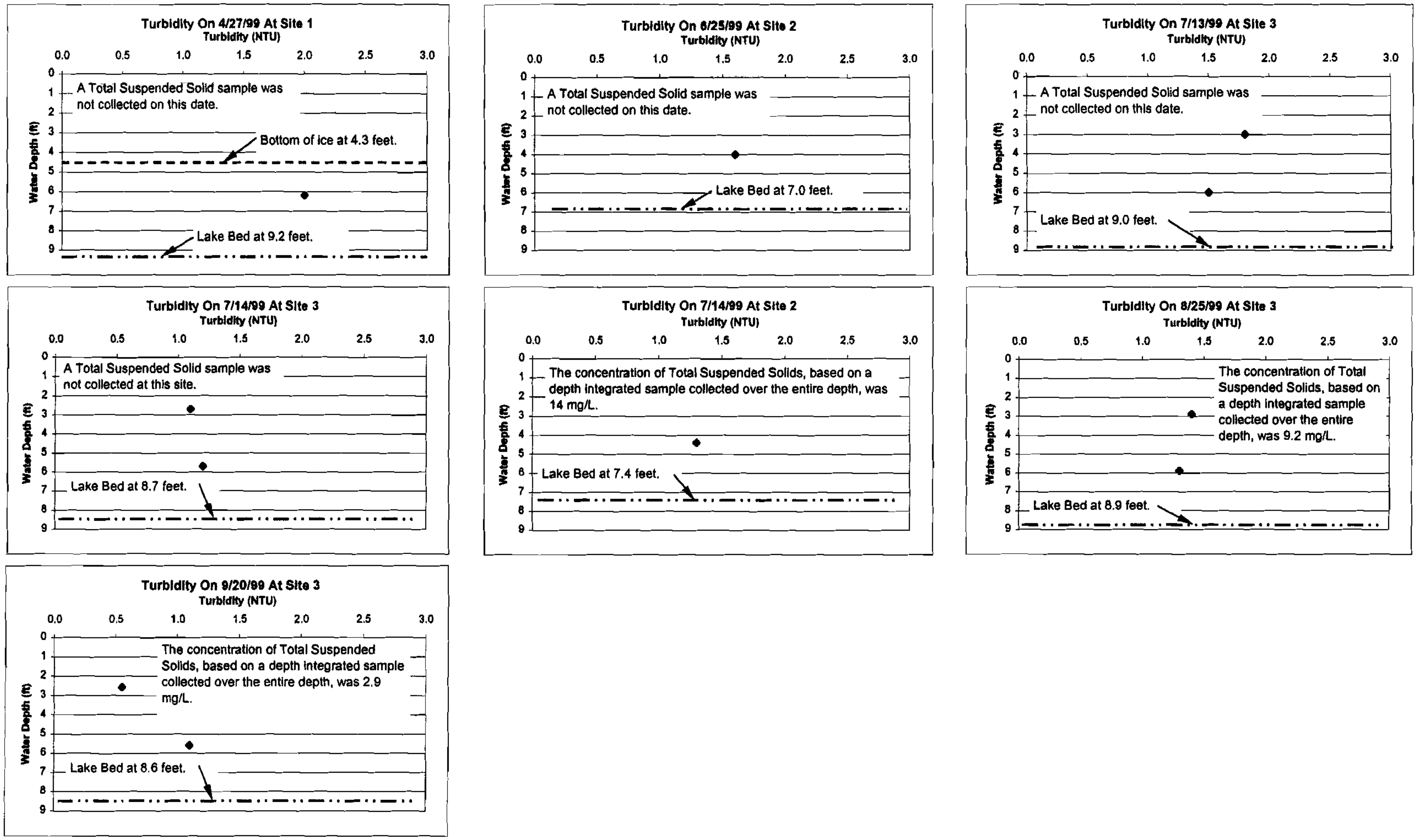
Note: See Table B-5 for site locations.

Figure B-5d: Lake 93-13 1999 Dissolved Oxygen Versus Depth



Note: See Table B-5 for site locations.

Figure B-5e: Lake 93-13 1999 Turbidity Versus Depth



Note: See Table B-5 for site location.

Table B-6: Lake 93-13 1998 Secondary Water Quality Parameters

Parameter	Units	ADEC Drinking Water Maximum Contaminant Level (1)	Sampling Date Results (2)					
			2/1/98	3/13/98	3/27/98	4/12/98	4/26/98	5/11/98
Primary Inorganic Chemicals								
Antimony	mg/L	0.006	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Arsenic	mg/L	0.05	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Barium	mg/L	2	0.149	0.183	0.196	0.195	0.212	0.202
Beryllium	mg/L	0.004	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Cadmium	mg/L	0.005	<0.0001	0.0001	0.0001	<0.0001	0.0001	0.0001
Chromium	mg/L	0.1	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Cyanide	mg/L	0.2	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Fluoride	mg/L	4.0	0.05	0.06	0.05	0.05	0.09	0.09
Mercury	mg/L	0.002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Nickel	mg/L	0.1	<0.028	<0.028	<0.028	<0.028	<0.028	<0.028
Nitrate	mg/L	10	<0.03	0.08	0.07	0.03	0.05	0.07
Selenium	mg/L	0.05	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Thallium	mg/L	0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Secondary Contaminants								
Aluminum	mg/L	0.2	<0.055	<0.055	<0.055	<0.055	<0.055	<0.055
Chloride	mg/L	250	34.2	48.7	54.8	43.6	54.5	41.8
Color	Units	15	20	30	10	15	10	10
Copper	mg/L	1.0	<0.050	<0.050	<0.050	<0.050	<0.008	<0.008
Langelier Index (Corrosivity)	(Unit)	Noncorrosive	-1.6	-1.4	-1.4	-0.7	-1.2	-0.7
Fluoride	mg/L	2.0	0.05	0.06	0.05	0.05	0.09	0.09
Foaming agents	mg/L	0.5	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Iron	mg/L	0.3	0.091	0.217	0.247	0.22	0.217	0.182
Manganese	mg/L	0.05	0.377	0.026	0.029	0.060	0.022	0.019
Odor (3)	TON	3	4	2	4	4	4	8
pH		6.5 - 8.5	7.0	6.9	6.9	7.6	7.0	7.6
Silver	mg/L	0.1	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Sodium	mg/L	250	18.6	25	25.8	24.5	27.2	23.7
Sulfate	mg/L	250	1.64	2.40	2.49	2.13	2.58	2.29
Total Dissolved Solids	mg/L	500	100	189	168	148	192	177
Zinc	mg/L	5	<0.008	0.059	0.012	0.024	0.009	0.008

Table B-6 (Continued): Lake 93-13 1998 Secondary Water Quality Parameters

Parameter	Units	ADEC Drinking Water Maximum Contaminant Level (1)	Sampling Date Results (2)					
			2/1/98	3/13/98	3/27/98	4/12/98	4/26/98	5/11/98
General Water Quality Parameters								
Calcium	mg/L	(4)	15.8	23.8	21.5	20.7	25.9	23.3
Alkalinity as CaCO3	mg/L	(4)	56	85	84	83	99	81
Bicarbonate Alkalinity	mg/L	(4)	56	85	84	83	99	81
Hardness as CaCO3	mg/L	(4)	65.4	93.5	91.3	88.4	110	96.7
Magnesium	mg/L	(4)	6.32	8.26	9.11	8.9	11	9.33
Volatile Organic Chemical Analysis (5)								
Benzene	mg/L	0.005	0.00027	0.00118	0.00088	0.00632	0.00141	0.00213
Ethylbenzene	mg/L	0.7	<0.00020	0.00105	0.00127	0.0107	0.00077	0.00370
Toluene	mg/L	1	0.00142	0.00600	0.00679	0.0635	0.00653	0.0186
Total Xylene	mg/L	10	0.00063	0.00607	0.00796	0.0529	0.00448	0.02123
n-Butylbenzene	mg/L	(4)	<0.00020	<0.00020	<0.00020	0.00060	<0.00020	0.00025
sec-Butylbenzene	mg/L	(4)	<0.00020	<0.00020	<0.00020	0.00067	<0.00020	0.00024
Isopropylbenzene	mg/L	(4)	<0.00020	0.00022	0.00027	0.00188	<0.00020	0.00072
p-Isopropyltoluene	mg/L	(4)	<0.00020	<0.00020	<0.00020	0.00066	<0.00020	0.00031
n-Propylbenzene	mg/L	(4)	<0.00020	0.00034	0.00042	0.00317	<0.00020	0.00123
1,2,4-Trimethylbenzene	mg/L	(4)	0.00021	0.00105	0.00135	0.00709	0.00048	0.00302
1,3,5-Trimethylbenzene	mg/L	(4)	0.00021	0.00058	0.00143	0.0109	0.00024	0.00181
Total Trihalomethanes								
Total Trihalomethanes	mg/L	0.10	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Radioactive Contaminants								
Gross Alpha Radioactivity (6)	pCi/L	15	ND@1+/-0.31	ND@1+/-0.34	ND@1+/-0.31	ND@1+/-0.31	ND@1+/-0.34	ND@1+/-0.36
Total Coliform Bacteria								
Total Coliform By Colilert		Not Detected	Not Detected	Not Detected	Not Detected	N/A	Not Detected	Not Detected
Fecal Coliform By Colilert		Not Detected	Not Detected	Not Detected	Not Detected	N/A	Not Detected	Not Detected
Turbidity								
Turbidity	NTU	5	0.85	1.7	1.4	1.4	1.45	1.0

Table B-6 (Continued): Lake 93-13 1998 Secondary Water Quality Parameters

Parameter	Units	ADEC Drinking Water Maximum Contaminant Level (1)	Sampling Date Results (2)			
			7/17/98	8/18/98	9/16/98	9/30/98
Primary Inorganic Chemicals						
Antimony	mg/L	0.006	<0.003	<0.003	<0.003	<0.003
Arsenic	mg/L	0.05	<0.004	<0.004	<0.004	<0.004
Barium	mg/L	2	0.0631	0.0734	0.0703	0.0670
Beryllium	mg/L	0.004	<0.0006	<0.0006	<0.0006	<0.0006
Cadmium	mg/L	0.005	<0.0001	<0.0001	<0.0001	<0.0001
Chromium	mg/L	0.1	<0.003	<0.003	<0.003	<0.003
Cyanide	mg/L	0.2	<0.02	<0.02	<0.02	<0.02
Fluoride	mg/L	4.0	<0.06	<0.06	0.70	<0.06
Mercury	mg/L	0.002	<0.0002	<0.0002	<0.0002	<0.0002
Nickel	mg/L	0.1	<0.005	<0.005	<0.005	<0.005
Nitrate	mg/L	10	<0.03	<0.03	<0.03	<0.03
Selenium	mg/L	0.05	<0.004	<0.004	<0.004	<0.004
Thallium	mg/L	0.002	<0.001	<0.001	<0.001	<0.001
Secondary Contaminants						
Aluminum	mg/L	0.2	<0.015	<0.02	<0.02	<0.02
Chloride	mg/L	250	27.2	27.5	32.1	28.9
Color	Units	15	10	10	10	<5.00
Copper	mg/L	1.0	<0.003	<0.003	<0.003	<0.003
Langelier Index (Corrosivity)	(Unit)	Noncorrosive	-0.4	-1.3	-1.8	-1.5
Fluoride	mg/L	2.0	<0.06	<0.06	0.70	<0.06
Foaming agents	mg/L	0.5	<0.10	<0.10	<0.10	<0.10
Iron	mg/L	0.3	0.083	0.089	0.086	0.079
Manganese	mg/L	0.05	0.008	0.022	0.010	0.009
Odor (3)	TON	3	2	2	2	<1.00
pH		6.5 - 8.5	7.7	7.7	7.3	7.5
Silver	mg/L	0.1	<0.0001	<0.0001	0.0001	<0.0001
Sodium	mg/L	250	13.4	14.3	14.5	14
Sulfate	mg/L	250	2.9	2.6	3.0	2.8
Total Dissolved Solids	mg/L	500	76	90	112	92
Zinc	mg/L	5	<0.003	0.156	0.045	<0.003

Table B-6 (Continued): Lake 93-13 1998 Secondary Water Quality Parameters

Parameter	Units	ADEC Drinking Water Maximum Contaminant Level (1)	Sampling Date Results (2)			
			7/17/98	8/18/98	9/16/98	9/30/98
General Water Quality Parameters						
Calcium	mg/L	(4)	8.19	9.25	9.35	9.47
Alkalinity as CaCO3	mg/L	(4)	30	34	30	32
Bicarbonate Alkalinity	mg/L	(4)	30	34	30	32
Hardness as CaCO3	mg/L	(4)	36.3	42.6	41.5	41.9
Magnesium	mg/L	(4)	<0.045	4.74	4.4	4.43
Volatile Organic Chemical Analysis (5)						
Benzene	mg/L	0.005	<0.00020	<0.00020	<0.00020	<0.00020
Ethylbenzene	mg/L	0.7	<0.00020	<0.00020	<0.00020	<0.00020
Toluene	mg/L	1	<0.00020	<0.00020	0.00042	<0.00020
Total Xylene	mg/L	10	<0.00020	<0.00020	<0.00020	<0.00020
n-Butylbenzene	mg/L	(4)	<0.00020	<0.00020	<0.00020	<0.00020
sec-Butylbenzene	mg/L	(4)	<0.00020	<0.00020	<0.00020	<0.00020
Isopropylbenzene	mg/L	(4)	<0.00020	<0.00020	<0.00020	<0.00020
p-Isopropyltoluene	mg/L	(4)	<0.00020	<0.00020	<0.00020	<0.00020
n-Propylbenzene	mg/L	(4)	<0.00020	<0.00020	<0.00020	<0.00020
1,2,4-Trimethylbenzene	mg/L	(4)	<0.00020	<0.00020	<0.00020	<0.00020
1,3,5-Trimethylbenzene	mg/L	(4)	<0.00020	<0.00020	<0.00020	<0.00020
Total Trihalomethanes						
Total Trihalomethanes	mg/L	0.10	<0.00050	<0.00050	<0.00050	<0.00050
Radioactive Contaminants						
Gross Alpha Radioactivity (6)	pCi/L	15	N/A	N/A	N/A	N/A
Total Coliform Bacteria						
Total Coliform By Colilert		Not Detected	N/A	Detected	Not Detected	Detected
Fecal Coliform By Colilert		Not Detected	N/A	Not Detected	Not Detected	Not Detected
Turbidity						
Turbidity	NTU	5	0.55	0.70	0.85	N/A

Table B-6 (Continued): Lake 93-13 1998 Secondary Water Quality Parameters

Notes:

1. Alaska Department of Environmental Conservation (ADEC) Drinking Water Maximum Contaminant Levels are listed in the Alaska Drinking Water Regulations (18 AAC 80) as amended through 1 October 1999, except for Aluminum, Foaming Agents and Silver which are from the regulations as amended through 10 November 1994.
2. Shaded areas indicate levels that do not meet the Alaska Drinking Water Regulations.
3. TON - Threshold Odor Number
4. Parameter is regulated by ADEC but a Maximum Contaminant Level is not specified.
5. Only the parameters within the Volatile Organic Group that had values above the method detection limit during February, March, April, May, July, August, or September are presented in the table above. Other Volatile Organics examined include: bromobenzene, bromochloromethane, bromodichloromethane, bromoform, bromomethane, tert-butylbenzene, carbon tetrachloride, chlorobenzene (monochlorobenzene), chloroethane, chloroform, chloromethane, 2-chlorotoluene, 4-chlorotoluene, dibromochloromethane, dibromomethane, 1,2-dichlorobenzene (o-dichlorobenzene), 1,3-dichlorobenzene, 1,4-dichlorobenzene (para-dichlorobenzene), dichlorodifluoromethane, 1,1-dichloroethane, 1,2-dichloroethane, 1,1-dichloroethene, cis-1,2-dichloroethene, trans-1,2-dichloroethene, 1,2-dichloropropane,1,3-dichloropropane, 2,2-dichloropropane, 1,1-dichloropropene, cis-1,3-dichloropropene, trans-1,3-dichloropropene, hexachlorobutadiene, methylene chloride (dichloromethane), naphthalene, styrene, 1,1,1,2-tetrachloroethane, 1,1,2,2-tetrachloroethane, tetrachloroethene, 1,2,3-trichlorobenzene, 1,2,4-trichlorobenzene, 1,1,1-trichloroethane, 1,1,2-trichloroethane, trichloroethene, trichlorofluoromethane, 1,2,3-trichloropropane, vinyl chloride, 4-bromofluorobenzene (BFB (Surr)), and 1,2-dichlorobenzene-d4 (1,2-DCB-d4 (Surr)). Laboratory results can be found in Appendix F.
6. The Gross Alpha Radioactivity is a statistical analysis and is reported as the mean value of the sample and the standard deviation. Additional samples were collected on 26 May and 9 June 1998. The result of the 26 May test was ND@1+/-0.38 pCi/L and the result of the 9 June test was ND@1+/-0.42 pCi/L.
7. The laboratory analyses were performed by Northern Testing Laboratories, Inc.

APPENDIX C

SAKOONANG CHANNEL AND EAST CHANNEL 1999 MONITORING DATA

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Methods

Water Level Monitoring

Water surface elevations were monitored at two locations along the Sakoonang Channel: river mile S6.47 near the Alpine Development, and river mile S15.79 near the upstream end of the channel. Three methods were used to monitor the elevation. All of the methods resulted in water surface elevations based on British Petroleum Mean Sea Level (BPMSL).

The first method used to monitor water surface elevations involved the use of level loop surveying between a monument with a known elevation and the water surface. This method was used periodically at all locations where water surface elevations were monitored.

The second method involved the use of staff gages. Staff gages were established at river miles S6.47 and S15.79 in the Sakoonang Channel and at river mile E27.09 in the East Channel. The staff gages were read periodically throughout the spring and summer. The height of the water on the staff gage was correlated to BPMSL by a level loop survey.

The third method involved the use of a MicroTides continuous water level recorder at river mile S15.79 in the Sakoonang Channel and at river mile E27.09 in the East Channel. The recorders were placed on the bed of the river and recorded the pressure above them at 10 minute intervals. A similar instrument was placed on the floodplain between the two recorders. By subtracting the air pressure recorded by the instrument on the floodplain from the total pressure recorded by the instruments on the riverbed, and applying a conversion factor, the depth of water above the instruments was computed. The depth of water above the water level recorder was correlated to BPMSL by a level loop survey.

Discharge Measurements In The Sakoonang Channel

Discharge measurements were made with a Mini or Price AA current meter, by wading or by suspension of the meter from a boat. The methods used to make the measurements and compute the discharge are as described in *Discharge Measurements at Gaging Stations* (Buchanan and Somers, 1984).

Discharge Estimates Based On Water Surface Elevation Measurements

Sakoonang Channel At River Mile S15.79

Estimates of the open water season discharge in the Sakoonang Channel were prepared based on one of two techniques. During the time when ice and snow were affecting the magnitude of the discharge associated with a particular water surface elevation, the discharge was estimated based on a combination of discharge, water surface elevation and water surface slope measurements, and normal depth computations. Once the ice and snow were no longer affecting the magnitude of the discharge at a particular water surface elevation, the data collected during the discharge measurements were used to develop a curvilinear relationship between water surface elevation and discharge. Based on a plot of the data, it was determined that for water surface elevations between 0.73 and 8.26 feet (BPMSL), three points could be used to describe the relationship between water surface elevation and discharge. At water surface elevations of 0, 3.33 and 8.26 feet (BPMSL), the discharge is 0, 552 and 1415 cfs, respectively. Using this relationship and the measured water surface elevations, discharge estimates were prepared for the period when ice and snow were not affecting the magnitude of the discharge at a particular water surface elevation.

East Channel At River Mile E27.09

As with the Sakoonang Channel, estimates of the open water season discharge in the East Channel were prepared based on one of two techniques. During the time when ice and snow were affecting the magnitude of the discharge associated with a particular water surface elevation, the discharge was estimated based on a combination of water surface elevation and water surface slope measurements, and normal depth computations. Once the ice and snow were no longer affecting the magnitude of the discharge at a particular water surface elevation, a stage-discharge curve developed in 1996 (Aldrich and Ray, 1996) was used with the water surface elevation measurements to estimate the discharge in the East Channel.

Water Quality Measurements In The Sakoonang Channel

Water quality samples were obtained from the Sakoonang Channel at a location near the flare pads at the Alpine Development.

Salinity, Conductivity, Temperature, Dissolved Oxygen

Salinity, conductivity and temperature were measured with a YSI Model 30 SCT meter. Dissolved oxygen and temperature were measured with a YSI Model 95 Dissolved Oxygen Meter.

Prior to making the measurements, the depth of water was measured and used to determine the measurement interval. Measurements were made at one-foot intervals from the riverbed to the surface, with no measurements being made within one foot of the surface. For instance, if the river was 9.6 feet deep, measurements were made at 8.6, 7.6, 6.6, 5.6, 4.6, 3.6, 2.6, and 1.6 feet from the water surface. To make the measurements, the probe to be used in making the measurement was attached to a weighted tape measure and lowered to the appropriate depth. Measurements were only recorded after the readings stabilized.

Turbidity

Turbidity was measured using a Hoch model 2100P Turbidimeter. Samples for turbidity measurement were obtained using one of two methods. The first method consisted of using a US D-74 depth-integrating sampler to collect two samples. The first sample contained water from the upper 6 feet of the water column and the second sample contained water from the entire water column (i.e. surface to 6 inches above the riverbed). The second method consisted of collecting discrete samples using a bailer. The lowest sample was collected 3 feet above the riverbed and additional samples were collected at three-foot intervals above the lowest sample. When discrete samples were taken, the turbidity was measured in each of the discrete samples.

Total Suspended Solids

A depth-integrated water sample was collected using a US D-74 depth-integrating sampler and shipped to Northern Testing Laboratories for analysis.

Secondary Water Quality Parameters

Primary inorganic chemicals, secondary contaminants, hardness, volatile organic chemicals, total Coliform Bacteria, and gross alpha radiation samples were collected by grab sample. Containers provided by the laboratory were filled as directed by the laboratory and shipped to Northern Testing Laboratories for analysis.

Results

A summary of the discontinuous water surface elevation measurements and observations made in the Sakoonang Channel are presented in Table C-1. Summaries of the discharge measurements made in the Sakoonang Channel are presented in Tables C-2 through C-10. A summary of both the continuous and discontinuous water surface elevation measurements made in the Sakoonang Channel, and the associated discharge estimates, is presented in Table C-11. A hydrograph of the 1999 Sakoonang Channel discharge is presented in Figure C-11. The primary water quality data collected during 1999 in the Sakoonang Channel is presented in Table C-12. Plots of the various parameters versus water depth are presented in Figures B-12a, B-12b, B-12c, B-12d and B-12e. The secondary water quality data collected during 1999 in the Sakoonang Channel is presented in Table C-13. A summary of both the continuous and discontinuous water surface elevation measurements made in the East Channel, and the associated discharge estimates, is presented in Table C-14. A hydrograph of the 1999 East Channel discharge is presented in Figure C-14.

Table C-1: Sakoonang Channel 1999 Water Surface Elevations And Observations At River Mile S6.47 (TBM 27U)

Date	Time	Water Surface Elevation (feet)	Observations
5/28/99	18:13	3.80	
5/29/99	9:08	4.03	Open water with some ice floes.
	17:36	4.03	
5/30/99	12:43	4.61	Low water channel ice is discontious immediately below staff gage. Some low water channel ice is visible where the sea ice road crossed the Sakoonang Channel.
	20:41	5.23	+/- 0.02 ft.
1999 High Water Mark		5.54	High water mark left sometime during the night of 5/30 - 5/31.
5/31/99	10:45	5.50	No floating ice.
	17:30	5.47	+/- 0.02 ft.
6/1/99	10:31	5.28	+/- 0.03 ft.
6/2/99	10:10	4.74	+/- 0.04 ft.
6/3/99	10:45	4.22	+/- 0.01 ft.
6/4/99	15:12	3.84	+/- 0.01 ft.
6/5/99	8:30	3.65	+/- 0.01 ft.
	12:52	3.59	+/- 0.02 ft.
6/6/99	11:30	3.24	
6/7/99	9:42	1.59	+/- 0.03 ft.
6/9/99	16:45	0.67	+/- 0.03 ft.
6/25/99	14:53	0.30	
6/26/99	12:52	0.20	
7/12/99	18:33	-0.08	+/- 0.01 ft. Upstream of boom. Boom is approximately 5 feet downstream of TBM.
	18:37	-0.03	+/- 0.03 ft. Downstream of boom.
	23:36	-0.37	+/- 0.01 ft. Upstream of boom.
	23:39	-0.36	+/- 0.01 ft. Downstream of boom.
7/13/99	10:22	-0.72	+/- 0.01 ft. Upstream of boom.
	16:11	-0.26	+/- 0.02 ft. Upstream of boom.
7/14/99	11:27	-0.94	+/- 0.01 ft. Upstream of boom.
	21:01	-0.54	+/- 0.01 ft. Upstream of boom.

Table C-1 (Continued): Sakoonang Channel 1999 Water Surface Elevations And Observations At River Mile S6.47 (TBM 27U)

Date	Time	Water Surface Elevation (feet)	Observations
7/15/99	7:21	-0.84	+/- 0.01 ft. Upstream of boom.
	9:54	-1.02	+/- 0.01 ft. Upstream of boom.
8/18/99	12:18	0.32	+/- 0.01 ft. Upstream of boom.
	12:19	0.32	+/- 0.02 ft. Downstream of boom.
8/19/99	17:35	-1.04	+/- 0.10 ft.
8/24/99	14:34	-0.46	+/- 0.02 ft.
9/21/99	11:54	0.33	+/- 0.01
9/25/99	15:22	0.72	+/- 0.01

Notes:
1. Staff gage elevations are based on an elevation of 11.12 feet (BPMSL) for Colville Monument 27, which was established in 1998.
2. GPS coordinates for TBM 27U are N 70° 21' 18.0" W 150° 54' 38.6" (NAD27), elevation = 7.05 feet (BPMSL).
3. The top of the Monument 27 cap is about 0.88 feet above the ground.
4. The top of the Cap 6P is about 0.50 feet above the ground.

Table C-2: Discharge Measurement At River Mile S16.20 On 29 May 1999

DISCHARGE MEASUREMENT NOTES

LOCATION: Sakoonang Channel TBM 8U

Date: 5/29 ,1999 **Party:** J. Meckel, J. Abrams

Width: 182' **Area:** 1200 ft^2 **Vel:** 1.22 fps **G.H.:** 8.76 (TBM 8U) **Disch.:** 1450 **cfs**

No Secs. 23 **G.H. change:** 0.02 ft **in.:** 2.01 **hrs.:** **Susp.:** 15 lbs

Method coef.: 1 **Hor. Angle coef.** 1 **Sus. Coef.:** **Meter No.**

Gage Readings				
Time	**Recorder**	**Inside**	**Outside**	
11:34	SG 9A	WSE = 8.75 BPMSL	-2.09	**Type of meter:** Price AA
11:15	TBM 8D	WSE = 8.72 BPMSL		**Date rated:** Factory
11:50	Start measurement			**Meter:** 0.5 **ft. above bottom of weight.**
				Spin before meas. **after**
13:35	End measurement			**Method:** Used hand line fom boat to obtain measurements
13:35	SG 9A	WSE = 8.77 BPMSL	-2.07	
15:24	SG 14	WSE = 8.81 BPMSL	3.82	
Weighted M.G.H.		WSE = 8.76 BPMSL		**Levels obtained** Yes
G.H. corrections				
Correct M.G.H.				

Measurement rated: Fair **based on following conditions:** Bottom hard, steady flow

Cross section: Fairly unifrom, snow/ice cover approx. 15% of the right bank based on later observations

Flow: Steady and uniform **Weather:** Overcast **Air oF@:** Mid 30's

Gage: Outside staff gage **Water oF@:**

Other:

Record Removed: **Intake flushed:**

Observer

Control Surface ice jam downstream ~ 1000', probable backwater affect. Snow drifts on both banks. Moderate ice floe. Firm bottom

Remarks Ice jam at downstream section cleared at 13:25

G.H. of zero flow: **ft.**

Table C-2 (Continued): Discharge Measurement At River Mile S16.20 On 29 May 1999

Angle coef.	Dist. From Initial point (ft)	Width (ft)	Depth (ft)	Observ. depth	Revo-lutions	Time In seconds	VELOCITY At Point (fps)	VELOCITY Mean in-vertical (fps)	Area (s.f.)	Discharge (cfs)	Description
1	8	3.0	1.6	0	0				4.8	0.0	LEW Vertical wall, measurement @ 11:50
1	14	6.0	3.0	0.8	1	43	0.07	0.08	18.0	1.4	Bottom firm - ice
1				0.2	2	69	0.08				
1	20	6.0	5.9	0.2	5	56	0.22	0.19	35.4	6.7	
1				0.8	5	75	0.17				
1	26	6.0	6.0	0.8	10	48	0.47	0.46	36.0	16.6	
1				0.2	10	52	0.44				
1	32	7.0	6.9	0.2	15	49	0.69	0.68	48.3	32.8	
1				0.8	15	50	0.67				
1	40	8.0	7.4	0.2	20	49	0.91	0.83	59.2	49.1	
1				0.8	15	45	0.75				
1	48	8.0	7.2	0.2	25	43	1.29	1.12	57.6	64.5	Bottom less firm
1				0.8	20	47	0.95				
1	56	8.0	7.7	0.2	30	47	1.41	1.14	61.6	70.2	Bottom soft
1				0.8	20	51	0.88				
1	64	8.0	7.8	0.2	30	47	1.41	1.17	62.4	73.0	
1				0.8	20	48	0.93				
1	72	8.0	7.8	0.2	30	44	1.51	1.32	62.4	82.4	Bottom feels like soft slush on ice
1				0.8	25	49	1.13				+/- 0.1 ft
1	80	8.0	8.0	0.2	40	55	1.61	1.42	64.0	90.9	
1				0.8	25	45	1.23				
1	88	8.0	8.0	0.2	30	42	1.58	1.39	64.0	89.0	Bottom firm - ice
1				0.8	25	46	1.20				
1	96	8.0	8.0	0.2	3	42	1.58	1.37	64.0	87.7	
1				0.8	25	48	1.16				
1	104	8.0	7.9	0.2	40	50	1.76	1.50	63.2	94.8	
1				0.8	25	45	1.23				
1	112	8.0	7.7	0.2	40	50	1.76	1.46	61.6	89.9	Bottom firm
1				0.8	25	48	1.16				

Table C-2 (Continued): Discharge Measurement At River Mile S16.20 On 29 May 1999

Angle coef.	Dist. From Initial point (ft)	Width (ft)	Depth (ft)	Observ. depth	Revo-lutions	Time In seconds	VELOCITY At Point (fps)	VELOCITY Mean in-vertical (fps)	Area (s.f.)	Discharge (cfs)	Description
1	120	8.0	7.5	0.2	40	48	1.84	1.60	60.0	96.0	
1				0.8	25	41	1.35				
1	128	8.0	7.5	0.2	30	42	1.58	1.46	60.0	87.6	
1				0.8	25	41	1.35				
1	136	8.0	7.8	0.2	40	50	1.76	1.62	62.4	101.1	
1				0.8	30	45	1.47				
1	144	8.0	7.7	0.2	40	51	1.73	1.46	61.6	89.9	
1				0.8	25	47	1.18				
1	152	8.0	7.4	0.2	30	41	1.62	1.46	59.2	86.4	
1				0.8	25	43	1.29				
1	160	8.0	6.7	0.2	30	45	1.47	1.28	53.6	68.6	Bottom firm
1				0.8	20	41	1.08				
1	168	8.0	5.0	0.2	25	41	1.35	1.23	40.0	49.2	
1				0.8	25	50	1.11				
1	176	8.0	3.3	0.2	20	50	0.892	0.85	26.4	22.4	
1				0.8	20	56	0.799				
1	184	7.0	1.5	0.6	3	110	0.079	0.08	10.5	0.8	
1	190	3.0	0.0						0.0	0.0	REW measurement @ 13:35
	182	182							1196	1451	

Table C-3: Discharge Measurement At River Mile S16.20 On 31 May 1999

DISCHARGE MEASUREMENT NOTES

LOCATION:	Sakoonang Channel TBM 8U						
Date:	5/31 ,1999	**Party:**	V. Robinson, J. Abrams				
Width:	169'	**Area:**	1120 ft^2	**Vel:**	1.23 fps	**G.H.:** 8.03 (TBM 8U)	**Disch.:** 1380 **cfs**
No Secs.	23	**G.H. change:**	0.13 ft	**in.:**	2.17	**hrs.:**	**Susp.:** 15 lbs
Method coef.:	1	**Hor. Angle coef.**	1	**Sus. Coef.:**		**Meter No.**	

Gage Readings

Time	Recorder	Inside	Outside
16:25	TBM 8U	WSE = 8.05 BPMSL	
15:53	Start measurement		
17:30	End measurement		
18:42	TBM 8U	WSE = 7.90 BPMSL	
Weighted M.G.H.		WSE = 8.03 BPMSL	
G.H. corrections			
Correct M.G.H.			

Type of meter: Price AA

Date rated: Factory

Meter: 0.5 **ft. above bottom of weight.**

Spin before meas. **after**

Method: Used hand line to obtain measurements w/ boat & tag line.

Levels obtained Yes

Measurement rated: Fair **based on following conditions:** Bottom is firm

Cross section: Uniform

Flow: Slow and steady **Weather:** Overcast **Air oF@:** Mid 30's

Gage: Outside staff gage **Water oF@:**

Other:

Record Removed: **Intake flushed:**

Observer

Control

Remarks Snow bank at REW. Assumed no flow under this snow bank and that outside edge of snow was the REW.

G.H. of zero flow: **ft.**

Table C-3 (Continued): Discharge Measurement At River Mile S16.20 On 31 May 1999

Angle coef.	Dist. From Initial point (ft)	Width (ft)	Depth (ft)	Observ. depth	Revo-lutions	Time In seconds	VELOCITY At Point (fps)	VELOCITY Mean in-vertical (fps)	Area (s.f.)	Discharge (cfs)	Description
1	215	4.0	0.0	0					0.0	0.0	LEW
1											
1	207	8.0	3.1	0.2	7	41	0.392	0.35	24.8	8.7	
1				0.8	7	53	0.308				
1	199	8.0	5.9	0.2	15	52	0.649	0.59	47.2	27.8	
1				0.8	10	44	0.515				
1	191	8.0	7.1	0.2	20	42	1.06	0.97	56.8	55.1	Bottom solid
1				0.8	20	51	0.875				
1	183	8.0	7.3	0.2	25	45	1.23	1.11	58.4	64.8	
1				0.8	20	45	0.989				
1	175	8.0	7.3	0.2	25	43	1.29	1.07	58.4	62.5	
1				0.8	20	53	0.843				
1	167	8.0	7.2	0.2	25	44	1.26	1.08	57.6	62.2	
1				0.8	20	50	0.892				
1	159	8.0	7.3	0.2	30	47	1.41	1.21	58.4	70.7	
1				0.8	20	44	1.01				
1	151	8.0	7.2	0.2	35	53	1.46	1.28	57.6	73.7	
1				0.8	25	51	1.09				
1	143	8.0	7.4	0.2	30	45	1.47	1.33	59.2	78.7	
1				0.8	25	47	1.18				
1	135	8.0	7.4	0.2	30	45	1.47	1.28	59.2	75.8	
1				0.8	20	41	1.08				
1	127	8.0	7.3	0.2	30	43	1.54	1.34	58.4	78.3	Bottom solid
1				0.8	25	49	1.13				
1	119	8.0	7.2	0.2	30	44	1.51	1.40	57.6	80.6	
1				0.8	25	43	1.29				
1	111	8.0	7.3	0.2	30	42	1.58	1.42	58.4	82.9	
1				0.8	25	44	1.26				
1	103	8.0	6.9	0.2	30	42	1.58	1.38	55.2	76.2	
1				0.8	25	47	1.18				

Table C-3 (Continued): Discharge Measurement At River Mile S16.20 On 31 May 1999

Angle coef.	Dist. From Initial point (ft)	Width (ft)	Depth (ft)	Observ. depth	Revo-lutions	Time In seconds	VELOCITY At Point (fps)	VELOCITY Mean in-vertical (fps)	Area (s.f.)	Discharge (cfs)	Description
1	95	8.0	6.5	0.2	30	42	1.58	1.42	52.0	73.8	
1			-	0.8	25	44	1.26				
1	87	8.0	6.6	0.2	35	45	1.72	1.46	52.8	77.1	
1				0.8	25	46	1.2				
1	79	8.0	6.8	0.2	35	46	1.68	1.50	54.4	81.6	
1				0.8	25	42	1.32				
1	71	8.0	6.8	0.2	35	46	1.68	1.44	54.4	78.3	
1				0.8	25	46	1.2				
1	63	8.0	6.7	0.2	35	45	1.72	1.45	53.6	77.7	
1				0.8	25	47	1.18				
1	55	8.0	6.7	0.2	25	40	1.38	1.26	53.6	67.5	
1				0.8	25	49	1.13				
1	47	4.5	6.7	0.2	20	41	1.08	1.00	30.2	30.2	
1				0.8	20	48	0.928				
1	46	0.5	0.0	0	0				0.0	0.0	REW at ice chunk
1											
1	31										REW - bank
	169	169							1118	1384	

Table C-4: Discharge Measurement At River Mile S16.20 On 4 June 1999

DISCHARGE MEASUREMENT NOTES							
LOCATION:	Sakoonang Channel TBM 8U						
Date:	6/4 ,1999	**Party:**	J. Abrams, J. Meckel				
Width:	182'	**Area:**	643 ft^2	**Vel:**	1.22 fps	**G.H.:** 4.70 (TBM 8U)	**Disch.:** 783 **cfs**
No Secs.	27	**G.H. change:**	0.06 ft	**in.:**	4	**hrs.:**	**Susp.:** Top set. rod
Method coef.:	1	**Hor. Angle coef.**	1	**Sus. Coef.:**	1	**Meter No.**	Standard

Gage Readings					
Time	**Recorder**	**Inside**	**Outside**	**Type of meter:**	Price AA
				Date rated:	
				Meter:	**ft. above bottom of weight.**
10:43	TBM 8U	WSE = 4.66 BPMSL	+/-0.02	**Spin before meas.**	**after** 3 min.
11:12	TBM0084	WSE = 4.56 BPMSL		**Method:**	Used top setting rod and pontoon boat with tag line
12:24	Start measurement				
14:22	End measurement				
14:47	TBM 8U	WSE = 4.72 BPMSL			
Weighted M.G.H.		WSE = 4.70 BPMSL		**Levels obtained**	This date
G.H. corrections					
Correct M.G.H.					

Measurement rated:	Good , 5%	**based on following conditions:**	Flow uniform, steady
Cross section:	Uniform, fairly firm, depth meas. +/- 0.1, soft mud but good definition		
Flow:	Steady	**Weather:**	**Air oF@:**
Gage:			**Water oF@:**
Other:			
Record Removed:	N/A	**Intake flushed:**	N/A
Observer			
Control	Channel free of ice, snow on banks above water surface		
Remarks	For original measurement data see Field Book #6 pages 24-28, Alpine 1999		
G.H. of zero flow:		**ft.**	
			Page 1 of 3

Table C-4 (Continued): Discharge Measurement At River Mile S16.20 On 4 June 1999

Angle coef.	Dist. From Initial point (ft)	Width (ft)	Depth (ft)	Observ. depth	Revo-lutions	Time In seconds	VELOCITY At Point (fps)	VELOCITY Mean in-vertical (fps)	Area (s.f.)	Discharge (cfs)	Description
1	208	1.5	0.0		0			0.00	0.0	0.0	LEW measurement @ 1224
1	205	3.5	1.2	0.6	10	61	0.38	0.38	4.2	1.6	
1	201	5.0	2.6	0.2	15	53	0.64	0.44	13.0	5.7	
1				0.6	10	41	0.55				
1				0.8	0	40	0.00				
1	195	7.0	3.5	0.2	20	52	0.86	0.77	24.5	18.9	
1				0.8	15	50	0.67				
1	187	8.0	3.8	0.2	20	43	1.03	0.85	30.4	25.8	
1				0.8	15	50	0.67				
1	179	7.0	4.1	0.2	25	48	1.16	1.00	28.7	28.7	
1				0.8	15	40	0.84				
1	173	7.0	3.9	0.2	25	44	1.26	1.04	27.3	28.4	
1				0.8	15	41	0.82				
1	165	8.0	3.6	0.2	25	43	1.29	1.04	28.8	30.0	
1				0.8	15	43	0.78				
1	157	8.0	3.9	0.2	30	49	1.35	1.12	31.2	34.9	
1				0.8	20	50	0.89				
1	149	8.0	4.0	0.2	30	47	1.41	1.24	32.0	39.7	
1				0.8	20	42	1.06				
1	141	8.0	4.1	0.2	25	40	1.38	1.22	32.8	40.0	
1				0.8	20	42	1.06				
1	133	8.0	4.0	0.2	30	46	1.44	1.24	32.0	39.7	
1				0.8	20	43	1.03				
1	125	8.0	4.0	0.2	30	42	1.58	1.32	32.0	42.2	
1				0.8	25	52	1.07				
1	117	8.0	3.9	0.2	30	41	1.62	1.42	31.2	44.3	
1				0.8	25	45	1.23				

Table C-4 (Continued): Discharge Measurement At River Mile S16.20 On 4 June 1999

Angle coef.	Dist. From Initial point (ft)	Width (ft)	Depth (ft)	Observ. depth	Revo-lutions	Time In seconds	VELOCITY At Point (fps)	VELOCITY Mean in-vertical (fps)	Area (s.f.)	Discharge (cfs)	Description
1	109	8.0	4	0.2	40	51	1.73	1.36	32.0	43.5	
1				0.8	20	45	0.989				
1	101	8.0	3.5	0.2	40	50	1.76	1.44	28.0	40.3	
1				0.8	25	49	1.13				
1	93	8.0	3.3	0.2	40	49	1.8	1.5	26.4	39.6	
1				0.8	25	46	1.2				
1	85	8.0	3.4	0.2	40	50	1.76	1.6	27.2	43.5	
1				0.8	30	46	1.44				
1	77	8.0	3.7	0.2	40	50	1.76	1.44	29.6	42.6	
1				0.8	25	49	1.13				
1	69	8.0	3.5	0.2	39	53	1.62	1.44	28.0	40.3	
1				0.8	25	44	1.26				
1	61	8.0	3.5	0.2	40	49	1.8	1.58	28.0	44.2	
1				0.8	25	41	1.35				
1	53	8.0	3.5	0.2	30	43	1.54	1.4	28.0	39.2	
1				0.8	25	44	1.26				
1	45	7.5	3.5	0.2	30	44	1.51	1.31	26	34.3	
1				0.8	20	40	1.11				
1	38	6.0	3.3	0.2	25	44	1.26	1.07	19.8	21.2	
1				0.8	20	51	0.875				
1	33	4.0	2.8	0.2	20	46	0.968	0.9	11.2	10.1	
1				0.8	15	40	0.837				
1	30	2.5	2.5	0.6	15	54	0.636	0.63	6.3	3.9	
1	28	2.0	2		0	40	0		4.0	0.0	
1	26	1.0	0						0.0	0.0	REW measurement @ 14:22
	182	182							643	783	

Table C-5: Discharge Measurement At River Mile S16.20 On 7 June 1999

DISCHARGE MEASUREMENT NOTES

LOCATION:	Sakoonang Channel TBM 8U						
Date:	6/7 ,1999	**Party:**	J. Meckel, J. Abrams				
Width:	179'	**Area:**	488 ft^2	**Vel:**	1.2 fps	**G.H.:** 3.78 (TBM 8U)	**Disch.:** 585 **cfs**
No Secs.	24	**G.H. change:**	0.05 ft	**in.:**	1.5	**hrs.:**	**Susp.:** Top set. Rod
Method coef.:	1	**Hor. Angle coef.**	1	**Sus. Coef.:**	1	**Meter No.**	Standard

Gage Readings			
Time	**Recorder**	**Inside**	**Outside**
14:16	TBM0084	WSE = 3.64 BPMSL	+/- 0.02
15:00	TBM 8U	WSE = 3.80 BPMSL	+/- 0.03
15:12	Start measurement		
16:11	End measurement		
16:30	TBM 8U	WSE = 3.75 BPMSL	+/- 0.04
17:00	TBM0084	WSE = 3.58 BPMSL	+/- 0.04
Weighted M.G.H.		WSE = 3.78 BPMSL	
G.H. corrections			
Correct M.G.H.			

Type of meter:	Price AA		
Date rated:			
Meter:	**ft. above bottom of weight.**		
Spin before meas.	3:30 min	**after**	2:30 min
Method:	Wading using top setting rod		
Levels obtained	Yes, before and after		

Measurement rated:	Good	**based on following conditions:**	Flow uniform, steady		
Cross section:	Excellent				
Flow:	Uniform	**Weather:**	Sunny	**Air oF@:**	
Gage:			Windy	**Water oF@:**	
Other:					
Record Removed:	N/A	**Intake flushed:**			
Observer					
Control	Banks clean, no snow or ice				
Remarks	At station 166, velocity near bottom disturbed due to clumps of shrubs				
G.H. of zero flow:		**ft.**			

Table C-5 (Continued): Discharge Measurement At River Mile S16.20 On 7 June 1999

Angle coef.	Dist. From Initial point (ft)	Width (ft)	Depth (ft)	Observ. depth	Revo-lutions	Time In seconds	VELOCITY At Point (fps)	VELOCITY Mean in-vertical (fps)	Area (s.f.)	Discharge (cfs)	Description
1											
1	206	2.0	0.0						0.0	0.0	LEW
1	202	3.0	1.2	0.6	10	47	0.48	0.48	3.6	1.7	
1	200	6.0	2.0	0.6	15	50	0.67	0.67	12.0	8.0	
1	190	9.0	2.8	0.2	25	48	1.16	1.04	25.2	26.2	
1				0.8	20	49	0.91				
1	182	8.0	3.2	0.2	25	49	1.13	1.01	25.6	25.9	
1				0.8	20	50	0.89				
1	174	8.0	3.0	0.2	25	44	1.26	1.07	24.0	25.7	
1				.8.	20	51	0.88				
1	166	8.0	2.8	0.2	25	44	1.26	0.99	22.4	22.2	
1				0.8	15	47	0.72				
1	158	8.0	3.1	0.2	30	46	1.44	1.25	24.8	31.0	
1				0.8	20	42	1.06				
1	150	8.0	3.0	0.2	30	44	1.51	1.31	24.0	31.4	
1				0.8	20	40	1.11				
1	142	8.0	3.2	0.2	25	39	1.42	1.31	25.6	33.5	
1				0.8	25	46	1.20				
1	134	8.0	3.2	0.2	30	47	1.41	1.22	25.6	31.2	
1				0.8	20	43	1.03				
1	126	8.0	3.1	0.2	30	43	1.54	1.30	24.8	32.2	
1				0.8	20	42	1.06				
1	118	8.0	2.9	0.2	30	47	1.41	1.32	23.2	30.6	
1				0.8	25	45	1.23				
1	110	8.0	3.0	0.2	30	41	1.62	1.34	24.0	32.2	
1				0.8	20	42	1.06				
1	102	8.0	3.0	0.2	30	43	1.54	1.25	24.0	30.0	
1				0.8	20	46	0.97				
1											

Table C-5 (Continued): Discharge Measurement At River Mile S16.20 On 7 June 1999

Angle coef.	Dist. From Initial point (ft)	Width (ft)	Depth (ft)	Observ. depth	Revo-lutions	Time In seconds	VELOCITY At Point (fps)	VELOCITY Mean in-vertical (fps)	Area (s.f.)	Discharge (cfs)	Description
1	94	8.0	2.8	0.2	30	42	1.58	1.44	22.4	32.3	
1				0.8	25	43	1.29				
1	86	8.0	2.6	0.2	30	44	1.51	1.32	20.8	27.5	
1				0.8	25	49	1.13				
1	78	8.0	2.8	0.2	30	42	1.58	1.38	22.4	30.9	
1				0.8	25	47	1.18				
1	70	8.0	2.8	0.2	30	46	1.44	1.28	22.4	28.7	
1				0.8	20	40	1.11				
1	62	8.0	2.6	0.2	30	45	1.47	1.26	20.8	26.2	
1				0.8	20	42	1.06				
1	54	8.0	2.6	0.2	25	41	1.35	1.24	20.8	25.8	
1				0.8	25	49	1.13				
1	46	8.0	2.5	0.2	25	41	1.35	1.13	20.0	22.6	
1				0.8	20	49	0.91				
1	38	8.0	2.5	0.2	25	42	1.32	1.2	20.0	24.0	
1				0.8	20	41	1.08				
1	30	5.5	1.8	0.6	10	47	0.48	0.48	9.9	4.8	
1	27	1.5	0						0.0	0.0	REW measurement @ 16:11
	179	179							488	585	

Table C-6: Discharge Measurement At River Mile S16.20 On 9 June 1999

DISCHARGE MEASUREMENT NOTES

LOCATION:	Sakoonang Channel TBM 8U						
Date:	6/9 ,1999	**Party:**	J.Meckel, J. Abrams				
Width:	177'	**Area:**	442 ft^2	**Vel:**	1.25 fps	**G.H.:** 3.50 (TBM8U)	**Disch.:** 552 **cfs**
No Secs.	26	**G.H. change:**	0.04 ft	**in.:**	1.6	**hrs.:**	**Susp.:** Top set. rod
Method coef.:	1	**Hor. Angle coef.**	1	**Sus. Coef.:**	1	**Meter No.**	Standard

Gage Readings				
Time	**Recorder**	**Inside**	**Outside**	**Type of mete** PRICE AA
				Date rated:
				Meter: ft. above bottom of weight.
17:11	TBM 8U	WSE = 3.48 BPMSL	+/- 0.02	**Spin before meas.** 3 **after** 3
				Method: Wading method with top setting rod.
17:35	Start measurement			
18:30	End measurement			
18:49	TBM 8U	WSE = 3.52 BPMSL	+/- 0.02	
19:06	TBM0084	WSE = 3.33 BPMSL	+/- 0.03	
Weighted M.G.H.				**Levels obtained** This date
G.H. corrections				
Correct M.G.H.		3.50 (TBM 8U)		

Measurement rated:	Good - 5%	**based on following conditions:**	Uniform
Cross section:	Fairly firm, uniform		
Flow:	Uniform distribution	**Weather:**	Rain, wind **Air oF@:**
Gage:			**Water oF@:**
Other:			
Record Removed:		**Intake flushed:**	
Observer			
Control	Channel clear - banks clean, no snow affect		
Remarks			
G.H. of zero flow:		ft.	

Table C-6 (Continued): Discharge Measurement At Rivr Mile S16.20 On 9 June 1999

Angle coef.	Dist. From Initial point (ft)	Width (ft)	Depth (ft)	Observ. depth	Revo-lutions	Time In seconds	VELOCITY At Point (fps)	VELOCITY Mean in-vertical (fps)	Area (s.f.)	Discharge (cfs)	Description
1	204	1.5	0.0						0.0	0.0	LEW 17:35
1											
1	201	3.0	1.1	0.6	10	56		0.41	3.3	1.3	
1	198	5.5	2.0	0.6	15	43		0.78	11.0	8.6	
1	190	8.0	2.5	0.2	25	48	1.160	1.02	20.0	20.4	
1				0.8	20	51	0.875				
1	182	8.0	3.0	0.2	25	44	1.260	1.05	24.0	25.2	
1				0.8	15	40	0.837				
1	174	8.0	2.8	0.2	30	47	1.410	1.19	22.4	26.7	
1				.8.	20	46	0.968				
1	166	8.0	2.8	0.2	25	42	1.320	0.92	22.4	20.6	
1				0.8	10	44	0.515				
1	158	8.0	2.8	0.2	30	43	1.540	1.30	22.4	29.1	
1				0.8	20	42	1.060				
1	150	8.0	2.7	0.2	30	43	1.540	1.39	21.6	30.0	
1				0.8	25	45	1.230				
1	142	8.0	2.9	0.2	30	41	1.620	1.30	23.2	30.2	
1				0.8	20	45	0.989				
1	134	8.0	2.9	0.2	40	53	1.670	1.45	23.2	33.6	
1				0.8	25	45	1.230				
1	126	8.0	2.8	0.2	30	42	1.580	1.47	22.4	32.9	
1				0.8	25	41	1.350				
1	118	8.0	2.7	0.2	40	51	1.730	1.46	21.6	31.5	
1				0.8	25	47	1.180				
1	110	8.0	2.6	0.2	40	51	1.730	1.36	20.8	28.3	
1				0.8	20	43	0.989				
1	102	8.0	2.7	0.2	30	40	1.650	1.39	21.6	30.0	
1				0.8	25	49	1.130				
1											

Table C-6 (Continued): Discharge Measurement At Rivr Mile S16.20 On 9 June 1999

Angle coef.	Dist. From Initial point (ft)	Width (ft)	Depth (ft)	Observ. depth	Revo-lutions	Time In seconds	VELOCITY At Point (fps)	VELOCITY Mean in-vertical (fps)	Area (s.f.)	Discharge (cfs)	Description
1	94	8.0	2.5	0.2	40	50	1.76	1.39	20.0	27.8	
1				0.8	20	44	1.01				
1	86	8.0	2.2	0.6	30	46	1.44	1.44	17.6	25.3	
1	78	8.0	2.5	0.2	30	44	1.51	1.3	20.0	26.0	
1				0.8	20	41	1.08				
1	70	8.0	2.5	0.2	30	42	1.58	1.41	20.0	28.2	
1				0.8	25	45	1.23				
1	6.2	8.0	2.4	0.6	25	42		1.32	19.2	25.3	
1	54	8.0	2.3	0.6	30	48		1.38	18.4	25.4	
1	46	8.0	2.3	0.6	25	44		1.26	18.4	23.2	
1	38	8.0	2.3	0.6	25	50		1.11	18.4	20.4	
1	30	5.0	1.6	0.6	7	59		0.279	8.0	2.2	
1	28	1.5	1.3	0.6	1	43		0.071	2.0	0.1	
1	27	0.5	0.0						0.0	0.0	REW @ 1830
	177	177							442	553	

Table C-7: Discharge Measurement At River Mile S17.0 On 17 August 1999

DISCHARGE MEASUREMENT NOTES					
LOCATION:	Inlet to Sakoonang Channel (near TBM 8I: N 70 deg 15 min 38.9 sec W 150 deg 51 min 20.7 sec)				
Date: August 17 ,1999	**Party:** J. Aldrich, J. Abrams				
Width: 13.7	**Area:** 5.24	**Vel:** 0.56	**G.H.:** WSE = 1.01 feet at TBM 8I	**Disch.:**	2.96 cfs
No Secs. 18	**G.H. change:**	0.12 **in.:**	0.92 **hrs.:**		**Susp.:**
Method coef.:	**Hor. Angle coef.**		**Sus. Coef.:**	**Meter No.**	

Gage Readings					
Time	**Recorder**	**Inside**	**Outside**	**Type of meter:**	Pygmy
				Date rated:	Factory
				Meter:	**ft. above bottom of weight.**
14:35			WSE = 1.00 BPMSL	**Spin before meas.** 55 sec.	**after** 42 sec
				Method:	Wading method with top setting rod,
14:45	Began discharge measurement.		WSE = 1.00 est.		near TBM 8I at inlet to Sakoonang Ch.
15:16	Finished discharge measurement.		WSE = 1.01 est.		
15:30			WSE = 1.02 BPMSL		
Weighted M.G.H.			WSE = 1.01 BPMSL	**Levels obtained**	
G.H. corrections			0.00		
Correct M.G.H.			WSE = 1.01 BPMSL	At TBM 8I	

Measurement rated:		**based on following conditions:**	
Cross section:			
Flow:		**Weather:**	**Air °F@:**
Gage:			**Water °F@:**
Other:			
Record Removed:		**Intake flushed:**	
Observer			
Control			
Remarks	WSE's based on an elevation of 26.69 (BPMSL) for Monument 8 and an elevation of 3.46 (BPMSL) for TBM 8I.		
G.H. of zero flow:		ft.	

Table C-7 (Continued): Discharge Measurement At River Mile S17.0 On 17 August 1999

Angle coef.	Dist. From Initial point (ft)	Width (ft)	Depth (ft)	Observ. depth	Revo-lutions	Time In seconds	VELOCITY At Point (fps)	VELOCITY Mean in-vertical (fps)	Area (s.f.)	Discharge (cfs)	Description
	14.7	0.5	0.00								Left edge of water
	13.7	1.0	0.09	***					0.09	0.00	Vel not measured, too shallow
	12.7	1.0	0.26	**	20	45	0.462	0.405	0.26	0.11	Vel measured 0.2 ft above bed
	11.7	1.0	0.32	**	25	40	0.639	0.581	0.32	0.19	Vel measured 0.2 ft above bed
	10.7	1.0	0.42	0.6	30	42	0.726	0.726	0.42	0.30	
	9.7	0.8	0.50	0.6	40	54	0.752	0.752	0.38	0.28	
	9.2	0.5	0.52	0.6	40	51	0.794	0.794	0.26	0.21	
	8.7	0.5	0.55	0.6	40	50	0.810	0.810	0.28	0.22	
	8.2	0.5	0.54	0.6	40	47	0.859	0.859	0.27	0.23	
	7.7	0.5	0.52	0.6	40	43	0.937	0.937	0.26	0.24	
	7.2	0.5	0.50	0.6	40	51	0.794	0.794	0.25	0.20	
	6.7	0.5	0.55	0.6	30	48	0.639	0.639	0.28	0.18	
	6.2	0.5	0.57	0.6	25	44	0.583	0.583	0.29	0.17	
	5.7	0.5	0.58	0.6	25	48	0.537	0.537	0.29	0.16	
	5.2	0.5	0.54	0.6	25	43	0.596	0.596	0.27	0.16	
	4.7	0.5	0.53	0.6	25	45	0.571	0.571	0.27	0.15	
	4.2	0.5	0.50	0.6	20	43	0.482	0.482	0.25	0.12	
	3.7	0.8	0.42	**	10	66	0.176	0.168	0.32	0.05	Vel measured 0.2 ft above bed
	2.7	1.4	0.38	**	0	61	0.000	0.00	0.51	0.00	Vel measured 0.2 ft above bed
	1.0	0.85	0.00								Right edget of water
	Total	13.7							5.24	2.96	

Table C-8: Discharge Masurement At River Mile S16.20 On 18 August 1999

DISCHARGE MEASUREMENT NOTES

LOCATION: Sakoonang Channel at TBM 8U					
Date: August 18 ,1999	**Party:** J. Aldrich, J. Abrams				
Width: 60.5	**Area:** 41.2	**Vel:** 1.00	**G.H.:** WSE = 0.89 feet at TBM 8U	**Disch.:**	41.1 **cfs**
No Secs. 28	**G.H. change:** 0.36	**in.:** 0.90	**hrs.:**	**Susp.:**	
Method coef.:	**Hor. Angle coef.**		**Sus. Coef.:**	**Meter No.**	

Gage Readings					
Time	**Recorder**	**Inside**	**Outside**	**Type of meter:**	Pygmy
				Date rated:	Factory
				Meter:	**ft. above bottom of weight.**
9:18	Level Survey		WSE = 0.93 BPMSL	**Spin before meas.** 52 sec	**after** 51 sec
				Method:	Wading method with top setting rod,
10:00	Began discharge measurement.		WSE = 0.91 est.		near TBM 8U.
10:54	Finished discharge measurement.		WSE = 0.88 est.		
11:08	Level Survey		WSE = 0.87 BPMSL		
Weighted M.G.H.			WSE = 0.89 BPMSL	**Levels obtained**	Yes
G.H. corrections			0		
Correct M.G.H.			WSE = 0.89 BPMSL	At TBM 8U	

Measurement rated: Excellent		**based on following conditions:**	
Cross section: Uniform			
Flow: Uniform		**Weather:** Overcast	**Air °F@:** 50
Gage:			**Water °F@:**
Other:			
Record Removed:		**Intake flushed:**	
Observer			
Control East Channel			
Remarks			
G.H. of zero flow:		**ft.**	

Table C-8 (Continued): Discharge Measurement At River Mile S16.20 On 18 August 1999

Angle coef.	Dist. From Initial point (ft)	Width (ft)	Depth (ft)	Observ. depth	Revo-lutions	Time In seconds	VELOCITY At Point (fps)	VELOCITY Mean in-vertical (fps)	Area (s.f.)	Discharge (cfs)	Description
	9	1									LEW
	11	2	0.35	0.6	25	44	0.583	0.583	0.7	0.41	
	13	2	0.65	0.6	40	42	0.958	0.958	1.3	1.25	
	15	2	0.85	0.6	40	42	0.958	0.958	1.7	1.63	
	17	2	0.79	0.6	50	42	1.190	1.190	1.6	1.88	
	19	2	1.02	0.6	50	47	1.070	1.070	2.0	2.18	
	21	1.5	1.04	0.6	50	43	1.160	1.160	1.6	1.81	
	22	1	1.02	0.6	60	48	1.250	1.250	1.0	1.28	
	23	1	0.95	0.6	50	45	1.110	1.110	1.0	1.05	
	24	1	0.95	0.6	60	45	1.330	1.330	1.0	1.26	
	25	1	0.94	0.6	50	42	1.190	1.190	0.9	1.12	
	26	1	0.88	0.6	70	58	1.210	1.210	0.9	1.06	
	27	1.5	0.83	0.6	60	50	1.200	1.200	1.2	1.49	
	29	2	0.80	0.6	50	49	1.020	1.020	1.6	1.63	
	31	2	0.71	0.6	50	49	1.020	1.020	1.4	1.45	
	33	2	0.68	0.6	50	54	0.933	0.933	1.4	1.27	
	35	2	0.72	0.6	50	53	0.950	0.950	1.4	1.37	
	37	2	0.72	0.6	40	48	0.842	0.842	1.4	1.21	
	39	2	0.75	0.6	50	51	0.986	0.986	1.5	1.48	
	41	2	0.71	0.6	50	57	0.885	0.885	1.4	1.26	
	43	2.5	1.00	0.6	50	52	0.967	0.967	2.5	2.42	
	46	3	0.95	0.6	60	56	1.070	1.070	2.9	3.05	
	49	3	0.90	0.6	60	49	1.220	1.220	2.7	3.29	
	52	3	0.73	0.6	50	48	1.050	1.050	2.2	2.30	
	55	3	0.68	0.6	50	60	0.842	0.842	2.0	1.72	
	58	3	0.50	0.6	40	50	0.810	0.810	1.5	1.22	
	61	3	0.43	0.6	25	48	0.537	0.537	1.3	0.69	
	64	3	0.36	0.6	15	50	0.321	0.321	1.1	0.35	
	67	56.5	Continued next sheet					Partial Sum	41.2	41.1	Continued next sheet

Table C-8 (Continued): Discharge Measurement At River Mile S16.20 On 18 August 1999

Angle coef.	Dist. From Initial point (ft)	Width (ft)	Depth (ft)	Observ. depth	Revo-lutions	Time In seconds	VELOCITY At Point (fps)	VELOCITY Mean in-vertical (fps)	Area (s.f.)	Discharge (cfs)	Description
	64	56.5	Continued from previous page.					Partial Sum	41.2	41.10	
	67	2.75	0.21	0.6	0	70	0.000	0.00	0.6	0.00	
	69.5	1.25									REW
	Total	60.5							41.2	40.90	

Table C-9: Discharge Measurement At River Mile S16.20 On 25 september 1999

DISCHARGE MEASUREMENT NOTES						
LOCATION: Sakoonang Channel 109 feet Downstream of TBM 8U						
Date: September 25, 1999	**Party:** J. Abrams, P. Stragier					
Width: 70.5	**Area:** 60.5	**Vel:** 0.78	**G.H.:** WSE = 1.41 feet at TBM 8U		**Disch.:**	47.2 **cfs**
No Secs. 22	**G.H. change:**	**in.:** 0.90	**hrs.:**		**Susp.:**	
Method coef.:		**Hor. Angle coef.**	**Sus. Coef.:**		**Meter No.**	
Gage Readings				**Type of meter:**	Pygmy	
Time	**Recorder**	**Inside**	**Outside**	**Date rated:** Factory		
15:55	Level Survey at 0084		WSE = 1.33 BPMSL	**Meter:**	**ft. above bottom of weight.**	
16:33	Level Survey at 8U		WSE = 1.43 BPMSL	**Spin before meas.** 52 sec		**after** 51 sec
				Method: Wading near TBM 8U		
17:00	Began discharge measurement.		WSE = 1.42 est. @ 8U			
17:30	Finished discharge measurement.		WSE = 1.41 est. @ 8U			
17:48	Level Survey at 8U		WSE = 1.40 BPMSL			
18:08	Level Survey at 0084		WSE = 1.26 BPMSL			
Weighted M.G.H.			WSE = 1.41 BPMSL	**Levels obtained**	Yes	
G.H. corrections			0			
Correct M.G.H.			WSE = 1.41 BPMSL	At TBM 8U		
Measurement rated: Good				**based on following conditions:**		
Cross section: Uniform						
Flow: Uniform				**Weather:** Partly Over	**Air °F@:** 34	
Gage:					**Water °F@:**	
Other:						
Record Removed:				**Intake flushed:**		
Observer						
Control East Channel						
Remarks						
G.H. of zero flow:				**ft.**		
					Page 1 of 2	

Table C-9 (Continued): Discharge Measurement At River Mile S16.20 On 25 August 1999

Angle coef.	Dist. From Initial point (ft)	Width (ft)	Depth (ft)	Observ. depth	Revo-lutions	Time In seconds	VELOCITY At Point (fps)	VELOCITY Mean in-vertical (fps)	Area (s.f.)	Discharge (cfs)	Description
	75.3	0.65									LEW
	74	1.4	0.38	0.6	10	53	0.212	0.212	0.5	0.11	
	72.5	1.5	0.70	0.6	25	44	0.583	0.583	1.1	0.61	
	71	1.75	0.90	0.6	25	40	0.639	0.639	1.6	1.01	
	69	2.5	1.12	0.6	30	44	0.694	0.694	2.8	1.94	
	66	3	1.30	0.6	35	44	0.805	0.805	3.9	3.14	
	63	3	1.25	0.6	40	46	0.878	0.878	3.8	3.29	
	60	3	1.38	0.6	50	50	1.000	1.000	4.1	4.14	
	57	2.5	1.42	0.6	50	52	0.967	0.967	3.6	3.43	
	55	2	1.49	0.6	40	44	0.916	0.916	3.0	2.73	
	53	2	1.49	0.6	40	43	0.937	0.937	3.0	2.79	
	51	2.5	1.40	0.6	50	53	0.950	0.950	3.5	3.33	
	48	3	1.05	0.6	40	46	0.878	0.878	3.2	2.77	
	45	3	1.19	0.6	40	47	0.851	0.851	3.6	3.04	
	42	3	1.00	0.6	40	51	0.794	0.794	3.0	2.38	
	39	3.5	0.90	0.6	30	42	0.726	0.726	3.2	2.29	
	35	4	0.92	0.6	30	42	0.726	0.726	3.7	2.67	
	31	4.5	0.88	0.6	30	45	0.679	0.679	4.0	2.69	
	26	5.5	0.78	0.6	30	48	0.639	0.639	4.3	2.74	
	20	7	0.50	0.6	25	48	0.537	0.537	3.5	1.88	
	12	7	0.19	0.6	7	42	0.191	0.191	1.3	0.25	
	6	3.6	0.03						0.1	0.00	
	4.8	0.6							0.0	0.00	REW
	Total	70.5							60.5	47.2	

Table C-10: Summary Of Discharge Measurements

Date	Time	Discharge (cfs)	Ground Surface Elevation At River Mile S17.0 (Channel Inlet) (ft)	Weighted Water surface Elevation At River Mile S17.0 (TBM 8I) (ft)	Weighted Water surface Elevation At River Mile S16.20 (TBM 8U) (ft)	Weighted Water surface Elevation At River Mile S15.79 (TBM 0084) (ft)	Notes
5/29/99	12:42	1450			8.76	8.68	1
5/31/99	16:42	1380			8.03	7.84	2
6/4/99	13:23	783			4.70	4.63	
6/7/99	15:42	585			3.78	3.54	
6/9/99	18:02	552			3.50	3.33	
9/25/99	17:15	47.2			1.41	1.29	
8/18/99	10:27	41.1			0.89	0.85	
8/17/99	15:00	2.96		1.01		0.55	
8/25/99	20:00	0	1.19			0.66	3
6/27/99	12:15	0	1.14			0.62	3

Notes:

1. There was an ice jam downstream during much of the measurement.
2. The bed of the river had ice on it and there was a downstream ice jam.
3. The weighted water surface elevation at TBM 0084 was linearly interpolated based on a measured water surface elevation at TBM 8I and water level recorder data at TBM 0084.

Table C-11: Sakoonang Channel 1999 Discharge At River Mile S15.79

Day	Water Surface Elev. at TBM0084			Discharge			Volume	Type of
	Max (ft)	Min (ft)	Average (ft)	Max (cfs)	Min (cfs)	Average (cfs)	(Million gpd)	Measure-ment
1-May								
2-May								
3-May								
4-May								
5-May								
6-May								
7-May								
8-May								
9-May								
10-May								
11-May								
12-May								
13-May								
14-May								
15-May								
16-May								
17-May								
18-May								
19-May								
20-May								
21-May								
22-May								
23-May								
24-May								
25-May								
26-May								
27-May	7.39	5.53	6.46	1190	680	934	604	d
28-May	8.44	7.39	8.06	1450	1190	1370	885	d
29-May	9.14	8.44	8.75	1490	1450	1470	950	d
30-May	9.64	8.73	9.34	3140	1430	2290	1480	d
31-May	8.73	7.29	7.88	3180	1220	2330	1510	d
						Total	**5430**	

Table C-11 (Continued): Sakoonang Channel 1999 Discharge At River Mile S15.79

Day	Water Surface Elev. at TBM0084			Discharge			Volume	Type of
	Max (ft)	Min (ft)	Average (ft)	Max (cfs)	Min (cfs)	Average (cfs)	(Million gpd)	Measure-ment
1-Jun	7.29	5.66	6.38	1220	932	1060	685	d
2-Jun	5.66	4.95	5.19	932	836	860	556	d
3-Jun	5.08	4.43	4.71	858	745	794	513	c
4-Jun	4.86	4.39	4.62	819	738	779	503	c
5-Jun	4.97	4.68	4.84	839	788	817	528	c
6-Jun	4.71	3.90	4.33	793	652	727	470	c
7-Jun	3.88	3.44	3.66	649	572	610	394	c
8-Jun	3.42	3.10	3.24	568	503	532	344	c
9-Jun	3.35	3.01	3.16	556	483	516	333	c
10-Jun	3.81	3.37	3.61	636	559	601	389	c
11-Jun	4.43	3.79	4.06	745	632	680	440	c
12-Jun	4.73	4.41	4.61	797	741	775	501	c
13-Jun	4.51	3.84	4.16	759	641	697	450	c
14-Jun	3.84	3.53	3.66	642	588	610	394	c
15-Jun	3.59	3.40	3.52	597	565	586	378	c
16-Jun	3.40	3.16	3.29	565	517	544	351	c
17-Jun	3.16	2.09	2.50	517	288	376	243	c
18-Jun	2.09	1.59	1.81	288	183	229	148	c
19-Jun	1.59	1.39	1.50	184	140	164	106	c
20-Jun	2.98	1.43	2.15	477	149	301	194	c
21-Jun	3.22	2.77	3.09	529	433	500	323	c
22-Jun	2.77	1.31	2.00	433	124	269	174	c
23-Jun	1.36	0.64	0.98	134	0	54	35	c
24-Jun	0.64	0.33	0.44	0	0	0	0	c
25-Jun	0.64	0.17	0.36	0	0	0	0	c
26-Jun	0.67	0.18	0.42	0	0	0	0	c
27-Jun	0.74	0.42	0.55	2	0	0	0	c
28-Jun	0.53	0.12	0.29	0	0	0	0	c
29-Jun	0.32	0.07	0.16	0	0	0	0	c
30-Jun	0.28	0.05	0.15	0	0	0	0	c
						Total	**8453**	

Table C-11 (Continued): Sakoonang Channel 1999 Discharge At River Mile S15.79

Day	Water Surface Elev. at TBM0084			Discharge			Volume (Million gpd)	Type of Measure-ment
	Max (ft)	Min (ft)	Average (ft)	Max (cfs)	Min (cfs)	Average (cfs)		
1-Jul	0.23	-0.02	0.09	0	0	0	0	c
2-Jul	0.69	0.12	0.39	0	0	0	0	c
3-Jul	0.53	0.28	0.41	0	0	0	0	c
4-Jul	0.51	0.07	0.25	0	0	0	0	c
5-Jul	0.42	0.12	0.25	0	0	0	0	c
6-Jul	0.95	0.28	0.67	0	0	0	0	c
7-Jul	0.69	0.46	0.57	0	0	0	0	c
8-Jul	0.65	0.16	0.40	0	0	0	0	c
9-Jul	0.42	0.09	0.21	0	0	0	0	c
10-Jul	0.72	0.00	0.27	0	0	0	0	c
11-Jul	0.44	-0.02	0.20	0	0	0	0	c
12-Jul	0.16	-0.02	0.05	0	0	0	0	c
13-Jul	0.02	-0.05	-0.01	0	0	0	0	c
14-Jul	0.02	-0.09	-0.06	0	0	0	0	c
15-Jul	0.03	-0.14	-0.08	0	0	0	0	c
16-Jul	0.31	-0.19	0.01	0	0	0	0	c
17-Jul	0.60	0.15	0.33	0	0	0	0	c
18-Jul	1.38	0.49	0.69	138	0	6	4	c
19-Jul	5.28	1.43	4.30	893	148	713	461	c
20-Jul	5.09	4.23	4.65	860	709	783	506	c
21-Jul	4.23	2.47	3.32	709	369	543	351	c
22-Jul	2.47	1.72	2.13	369	211	298	193	c
23-Jul	1.83	1.69	1.76	234	204	218	141	c
24-Jul	1.80	1.62	1.68	228	188	202	131	c
25-Jul	1.77	1.59	1.69	222	182	204	132	c
26-Jul	1.82	1.00	1.54	231	58	173	112	c
27-Jul	1.00	0.31	0.73	58	0	19	12	c
28-Jul	0.39	0.21	0.27	0	0	0	0	c
29-Jul	0.25	0.13	0.18	0	0	0	0	c
30-Jul	0.15	0.01	0.09	0	0	0	0	c
31-Jul	0.17	-0.02	0.04	0	0	0	0	c
						Total	**2042**	

Table C-11 (Continued): Sakoonang Channel 1999 Discharge At River Mile S15.79

Day	Water Surface Elev. at TBM0084			Discharge			Volume (Million gpd)	Type of Measure-ment
	Max (ft)	Min (ft)	Average (ft)	Max (cfs)	Min (cfs)	Average (cfs)		
1-Aug	0.07	-0.07	0.00	0	0	0	0	c
2-Aug	0.57	0.02	0.33	0	0	0	0	c
3-Aug	0.27	-0.01	0.11	0	0	0	0	c
4-Aug	0.06	-0.15	-0.09	0	0	0	0	c
5-Aug	-0.07	-0.14	-0.12	0	0	0	0	c
6-Aug	0.50	-0.14	0.27	0	0	0	0	c
7-Aug	0.45	0.17	0.27	0	0	0	0	c
8-Aug	0.26	-0.16	-0.01	0	0	0	0	c
9-Aug	-0.11	-0.23	-0.17	0	0	0	0	c
10-Aug	0.13	-0.12	0.00	0	0	0	0	c
11-Aug	0.43	-0.22	-0.05	0	0	0	0	c
12-Aug	1.14	0.43	0.87	86	0	38	25	c
13-Aug	1.02	0.69	0.86	61	0	27	18	c
14-Aug	0.87	0.41	0.63	29	0	4	3	c
15-Aug	0.89	0.68	0.79	33	0	14	9	c
16-Aug	0.72	0.23	0.52	0	0	0	0	c
17-Aug	1.22	0.02	0.46	48	0	10	6	c
18-Aug	1.29	0.52	0.84	57	0	25	16	c
19-Aug	0.98	0.55	0.81	52	0	23	15	c
20-Aug	0.81	0.02	0.37	18	0	2	1	c
21-Aug	0.40	-0.06	0.13	0	0	0	0	c
22-Aug	0.10	-0.11	-0.02	0	0	0	0	c
23-Aug	0.04	-0.12	-0.03	0	0	0	0	c
24-Aug	0.11	-0.09	-0.01	0	0	0	0	c
25-Aug	-0.02	-0.17	-0.10	0	0	0	0	c
26-Aug	-0.12	-0.25	-0.17	0	0	0	0	c
27-Aug	0.62	-0.23	0.33	0	0	0	0	c
28-Aug	0.16	-0.14	-0.03	0	0	0	0	c
29-Aug	-0.07	-0.19	-0.13	0	0	0	0	c
30-Aug	-0.09	-0.16	-0.12	0	0	0	0	c
31-Aug	-0.07	-0.19	-0.13	0	0	0	0	c
						Total	**92**	

Table C-11 (Continued): Sakoonang Channel 1999 Discharge At River Mile S15.79

Day	Water Surface Elev. at TBM0084			Discharge			Volume (million gpd)	Type of Measurement
	Max (ft)	Min (ft)	Average (ft)	Max (cfs)	Min (cfs)	Average (cfs)		
1-Sep	0.37	-0.05	0.14	0	0	0	0	c
2-Sep	-0.01	-0.24	-0.14	0	0	0	0	c
3-Sep	0.78	-0.23	0.34	0	0	0	0	c
4-Sep	1.61	0.65	1.10	0	0	0	0	c
5-Sep	1.60	0.53	1.01	0	0	0	0	c
6-Sep	1.61	0.65	1.17	0	0	0	0	c
7-Sep	1.04	0.53	0.75	0	0	0	0	c
8-Sep	0.54	0.03	0.28	0	0	0	0	c
9-Sep	0.04	-0.10	-0.05	0	0	0	0	c
10-Sep	0.43	-0.07	0.15	0	0	0	0	c
11-Sep	0.51	0.11	0.26	0	0	0	0	c
12-Sep	0.72	0.28	0.50	0	0	0	0	c
13-Sep	0.63	0.31	0.45	0	0	0	0	c
14-Sep	0.31	-0.05	0.08	0	0	0	0	c
15-Sep	0.00	-0.15	-0.08	0	0	0	0	c
16-Sep	0.13	-0.15	-0.11	0	0	0	0	c
17-Sep	0.70	0.05	0.37	0	0	0	0	c
18-Sep	0.79	0.38	0.66	12	0	2	1	c
19-Sep	0.38	0.17	0.27	0	0	0	0	c
20-Sep	0.55	-0.08	0.11	0	0	0	0	c
21-Sep	0.67	0.15	0.45	0	0	0	0	c
22-Sep	0.65	-0.15	0.11	0	0	0	0	c
23-Sep	2.59	0.65	1.32	161	0	72	46	c
24-Sep	3.30	2.34	2.84	212	129	174	113	c
25-Sep	2.31	0.98	1.63	128	15	72	47	c
26-Sep								
27-Sep								
28-Sep								
29-Sep								
30-Sep								
						Total	**207**	

Notes:
1. Two types of measurements were used. Discrete water surface elevation measurements are designated by a "d". The number of measurements per day varied from one to five. Continuous water surface elevation measurements are designated by a "c". The instrument used to obtain the continuous measurements records 1 minute averages of water depth above the instrument every 10 minutes, throughout the day.
2. Observations of water surface elevation and flow began on 27 May 1999.

Figure C-11: Sakoonang Channel 1999 Hydrograph At River Mile S15.79

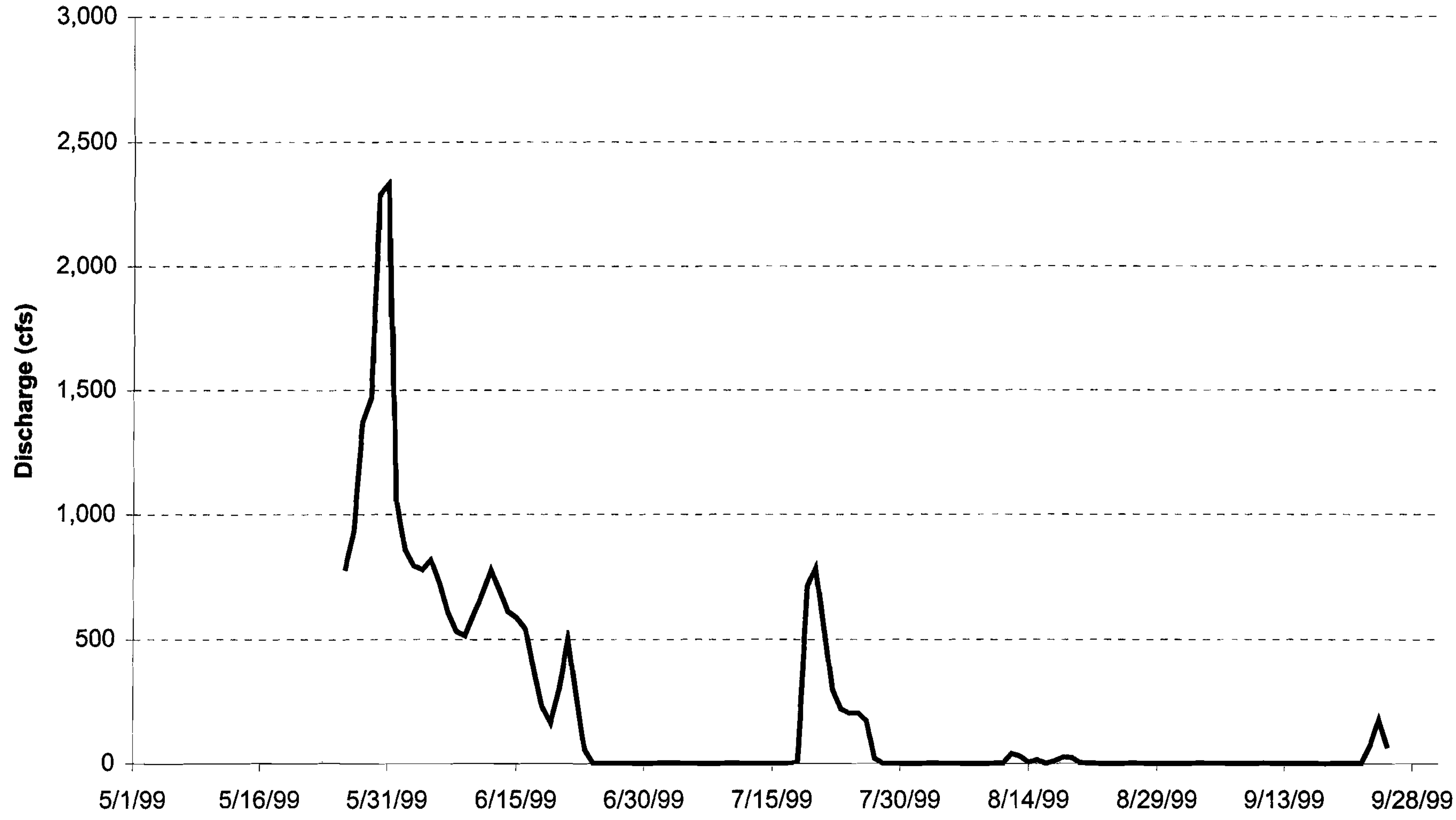


Table C-12: 1999 Sakoonang Channel 1999 Primary Water Quality Parameters

Date	Location	Water Surface Elevation (feet)	Sample Depth (ft)	Water Temp (5) (C)	Salinity (ppt)	Conduct-ivity (µS)	Dissolved Oxygen (mg/L)	Turbidity (NTU)	TSS (mg/L)
4/28/99	N 70° 20' 24.5"	-0.54	5.1	-1.1	22.6		16.0		
(1)	W 150° 55' 31.4"		6.1	-1.1	22.6		18.5		
	(NAD27)		7.1	-1.1	22.6		17.9	0.95	
			8.1	-1.1	22.6		10.2		
			9.1	-1.1	22.6		9.8		
			10.1	-1.1	22.6		9.0	1.1	
			11.1	-1.1	22.6		5.6		
			12.1	-1.1	22.7		5.8		
			13.1	-0.9	22.7		5.9	1.1	
			14.1	-0.9	22.7		5.4		
			15.1	-0.9	22.8		4.8		
			16.1	River Bed					
5/31/99	TBM 8U	7.90	Depth Integrated 0 - 7 feet					80	160
6/1/99	TBM 8U	6.52	Grab Sample 0 - 0.5 feet					80	
6/3/99	F2 170	3.32	1.0	1.9	0.1	1.83	13.00		
(2)	N 70° 20' 25.5"		2.0	1.9	0.1	84.5	12.90		
	W 150° 55' 29.1"		3.0	1.8	0.1	84.3	12.89		
	(NAD27)		4.0	1.9	0.1	83.7	12.89		
			5.0	2.0	0.1	84.0	12.97		
			6.0	2.1	0.1	82.0	12.99		
			7.0	2.1	0.1	81.3	12.98		
			8.0	2.1	0.1	83.4	12.97		
			9.0	2.1	0.1	81.2	12.99		
			10.0	2.1	0.1	80.0	12.96		
			11.0	2.1	0.1	81.3	12.97		
			12.0	2.1	0.1	81.0	12.97		
			13.0	2.2	0.1	79.6	12.97		
			14.0	2.2	0.1	79.9	12.97		
			15.0	2.2	0.1	80.0	12.96		
			16.0	2.2	0.1	80.1	12.95		
			17.0	River Bed					
6/6/99	F2 170	2.34	1.8	5.1	0.1	84.9	12.68		
(2)	N 70° 20' 25.5"		2.8	5.2	0.1	83.8	12.68		
	W 150° 55' 29.1"		3.8	5.2	0.1	84.8	12.68		
	(NAD27)		4.8	5.1	0.1	85.2	12.70		
			5.8	5.1	0.1	85.7	12.69		
			6.8	5.2	0.1	84.0	12.71		
			7.8	5.2	0.1	84.3	12.72		
			8.8	5.2	0.1	85.3	12.72		

Table C-12 (Continued): Sakoonang Channel 1999 Primary Water Quality Parameters

Date	Location	Water Surface Elevation (feet)	Sample Depth (ft)	Water Temp (5) (C)	Salinity (ppt)	Conduct-ivity (µS)	Dissolved Oxygen (mg/L)	Turbidity (NTU)	TSS (mg/L)
6/6/99	continued		9.8	5.2	0.1	84.5	12.74		
			10.8	5.3	0.1	84.1	12.74		
			11.8	5.2	0.1	84.8	12.75		
			12.8	5.2	0.1	84.5	12.74		
			13.8	5.2	0.1	84.9	12.75		
			14.8	5.2	0.1	84.5	12.74		
			15.8	5.2	0.1	85.0	12.75		
			16.8	River Bed					
			Depth Integrated 0 - 6 feet					75	92
			Depth Integrated 0 - 16.8 feet					70	87
6/8/99 (2)	F2 170 N 70° 20' 25.5" W 150° 55' 29.1" (NAD27)	1.19	1.4	3.7	0.1	97.1	12.71		
			2.4	3.7	0.1	97.1	12.70		
			3.4	3.8	0.1	97.1	12.71		
			4.4	3.8	0.1	97.0	12.71		
			5.4	3.8	0.1	97.2	12.71		
			6.4	3.8	0.1	97.2	12.69		
			7.4	3.8	0.1	97.2	12.70		
			8.4	3.8	0.1	97.3	12.69		
			9.4	3.8	0.1	97.4	12.70		
			10.4	3.8	0.1	97.4	12.70		
			11.4	3.8	0.1	97.3	12.69		
			12.4	3.8	0.1	97.3	12.69		
			13.4	3.8	0.1	97.4	12.69		
			14.4	3.8	0.1	97.4	12.70		
			15.4	River Bed					
			Depth Integrated 0 - 6 feet					65	
			Depth Integrated 0 - 15.4 feet					50	
6/10/99 (2)	F2 170 N 70° 20' 25.5" W 150° 55' 29.1" (NAD27)	0.64	1.3	5.6	0	62.3	12.20		
			2.3	5.6	0	62.3	12.24		
			3.3	5.6	0	62.3	12.23		
			4.3	5.6	0	62.4	12.22		
			5.3	5.6	0	62.2	12.21		
			6.3	5.7	0	62.3	12.22		
			7.3	5.7	0	62.7	12.22		
			8.3	5.7	0	63.0	12.22		
			9.3	5.7	0	62.7	12.21		
			10.3	5.7	0	62.9	12.21		
			11.3	5.7	0	63.0	12.22		
			12.3	5.7	0	63.0	12.20		

Table C-12 (Continued): Sakoonang Channel 1999 Primary Water Quality Parameters

Date	Location	Water Surface Elevation (feet)	Sample Depth (ft)	Water Temp (5) (C)	Salinity (ppt)	Conduct-ivity (µS)	Dissolved Oxygen (mg/L)	Turbidity (NTU)	TSS (mg/L)
			13.3	5.7	0	62.8	12.20		
			14.3	5.7	0	62.6	12.19		
6/10/99	continued		15.3	River Bed					
			Depth Integrated 0 - 6 feet					31	
			Depth Integrated 0 - 15.3 feet					31	
6/25/99	F2 170	0.30	1.7	11.4	0.2	308.7	11.60		
(2)	N 70° 20' 25.5"		2.7	10.9	0.2	308.0	11.72		
	W 150° 55' 29.1"		3.7	10.7	0.2	306.6	11.76		
	(NAD27)		4.7	10.7	0.2	304.5	11.75		
			5.7	10.6	0.2	303.3	11.80		
			6.7	10.5	0.2	303.3	11.79		
			7.7	10.5	0.2	303.2	11.80		
			8.7	10.5	0.2	303.3	11.82		
			9.7	10.4	0.2	303.0	11.84		
			10.7	10.4	0.2	302.9	11.85		
			11.7	10.4	0.2	302.9	11.85		
			12.7	10.4	0.2	302.9	11.85		
			13.7	10.3	0.2	303.2	11.83		
			14.7	River Bed					
			Depth Integrated 0 - 6 feet					60	32
			Depth Integrated 0 - 14.7 feet					55	32
7/13/99	F2 170	-0.72 (10:24)	1.7	12.9	0.4	662	10.53		
(2)	N 70° 20' 25.5"	-0.26 (16:08)	2.7	12.9	0.4	662	10.54		
	W 150° 55' 29.1"		3.7	12.9	0.4	662	10.52		
	(NAD27)		4.7	12.9	0.4	662	10.55		
			5.7	12.9	0.4	663	10.52		
			6.7	12.9	0.4	664	10.52		
			7.7	12.9	0.4	664	10.53		
			8.7	12.9	0.4	664	10.49		
			9.7	12.8	0.4	665	10.48		
			10.7	12.8	0.4	667	10.48		
			11.7	12.8	0.4	664	10.47		
			12.7	12.6	0.4	661	10.40		
			13.7	River Bed					
			Depth Integrated 0 - 6 feet					7.4	
7/13/99	F2a 122	-0.72 (10:24)	1.9	14.2	0.4	702	10.53		
(3)	N 70° 20' 23.9"	-0.26 (16:08)	2.9	14.1	0.4	699	10.56		
	W 150° 55' 31.3"		3.9	13.9	0.4	697	10.54		

Table C-12 (Continued): Sakoonang Channel 1999 Primary Water Quality Parameters

Date	Location	Water Surface Elevation (feet)	Sample Depth (ft)	Water Temp (5) (C)	Salinity (ppt)	Conduct-ivity (µS)	Dissolved Oxygen (mg/L)	Turbidity (NTU)	TSS (mg/L)
7/13/99	(NAD27)		4.9	14.0	0.4	697	10.58		
continued			5.9	13.7	0.4	690	10.54		
			6.9	13.6	0.4	686	10.56		
			7.9	13.5	0.4	682	10.59		
			8.9	13.5	0.4	682	10.58		
			9.9	13.5	0.4	682	10.58		
			10.9	13.4	0.4	682	10.58		
			11.9	13.4	0.4	681	10.55		
			12.9	13.4	0.4	682	10.54		
			13.9	13.4	0.4	682	10.54		
			14.9	13.2	0.4	680	10.47		
			15.9	12.5	0.5	724	9.69		
			16.9	River Bed					
			Depth Integrated 0 - 6 feet					9.4	10
			Depth Integrated 0 - 16.9 feet					10	11
8/19/99	F2a 122	-1.04	1.6	7.3	0.2	307.2	12.16		
(3)			2.6	7.3	0.2	306.7	12.04		
			3.6	7.3	0.2	306.7	12.01		
			4.6	7.3	0.2	306.3	11.97		
			5.6	7.3	0.2	305.7	11.94		
			6.6	7.3	0.2	307.6	11.95		
			7.6	7.3	0.2	305.4	11.93		
			8.6	7.3	0.2	305.2	11.95		
			9.6	7.3	0.2	305.6	11.95		
			10.6	7.3	0.2	305.0	11.91		
			11.6	7.3	0.2	307.5	11.94		
			12.6	7.3	0.2	303.3	11.92		
			13.6	7.3	0.2	304.1	11.92		
			14.6	9.2	3.0	3300	8.97		
			15.6	11.3	4.0	5320	10.76		
			16.6	River Bed					
			Depth Integrated 0 - 6 feet					70	96
			Depth Integrated 0 - 16.6 feet					70	88
9/21/99	F2a 122	0.30	1.6	2.9	2.8	3077	13.21		
(3)			2.6	2.9	2.8	3076	13.22		
			3.6	2.9	2.8	3076	13.24		
			4.6	2.9	2.8	3077	13.26		
			5.6	2.9	2.8	3078	13.24		
			6.6	2.9	2.8	3079	13.22		
			7.6	2.9	2.9	3102	13.23		

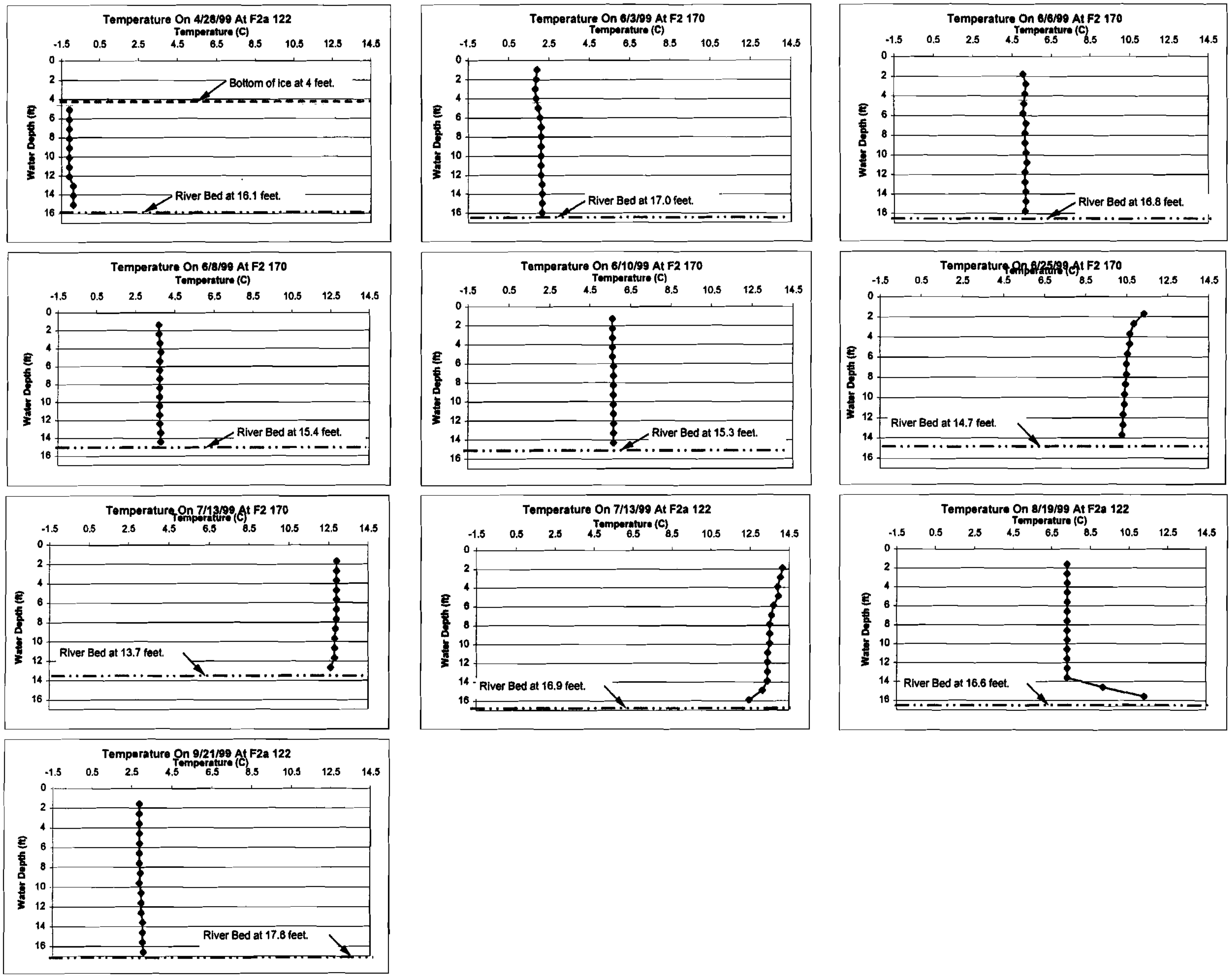
Table C-12 (Continued): Sakoonang Channel 1999 Primary Water Quality Parameters

Date	Location	Water Surface Elevation (feet)	Sample Depth (ft)	Water Temp (5) (C)	Salinity (ppt)	Conduct-ivity (µS)	Dissolved Oxygen (mg/L)	Turbidity (NTU)	TSS (mg/L)
9/21/99	continued		8.6	3.0	2.9	3140	13.20		
			9.6	2.9	3.0	3194	13.07		
			10.6	3.0	3.3	3592	13.09		
			11.6	3.0	3.4	3623	13.12		
			12.6	3.0	3.4	3633	13.06		
			13.6	3.1	3.4	3645	12.98		
			14.6	3.1	3.4	3651	12.91		
			15.6	3.1	3.4	3659	12.89		
			16.6	3.1	3.4	3666	12.64		
			17.6	River Bed					
			Depth Integrated 0 - 6 feet					11	11
			Depth Integrated 0 - 17.6 feet					11	8

Notes:

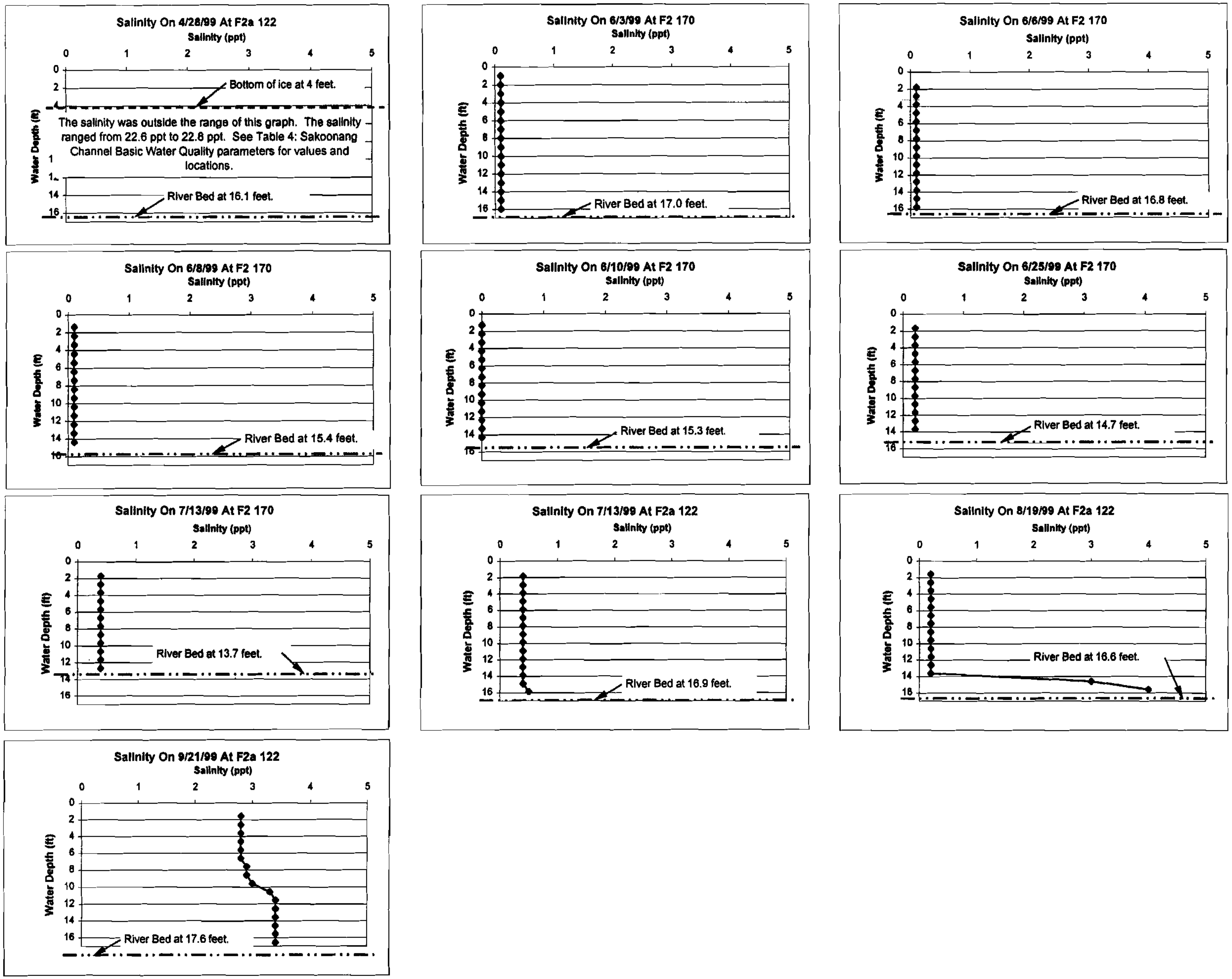
1. On this date the Channel was covered with ice. The ice thickness was 4.0 feet and the distance from the top of the ice to the water surface was 0.4 feet.
2. F2 170 denotes that the sample was collected near the southern flare pit approximately 46 feet from the left bank (See Figure 1).
3. F2a 122 denotes that the sample was collected near the southern flare pit approximately 60 feet from the left bank and is approximately 150 feet upstream from site F2 170 (See Figure 1).
4. The temperature is the average temperature from the DO meter and the SCT meter. The difference between the temperatures was generally within the accuracy of the instruments.

Figure C-12a: Sakoonang Channel 1999 Water Temperature Versus Depth



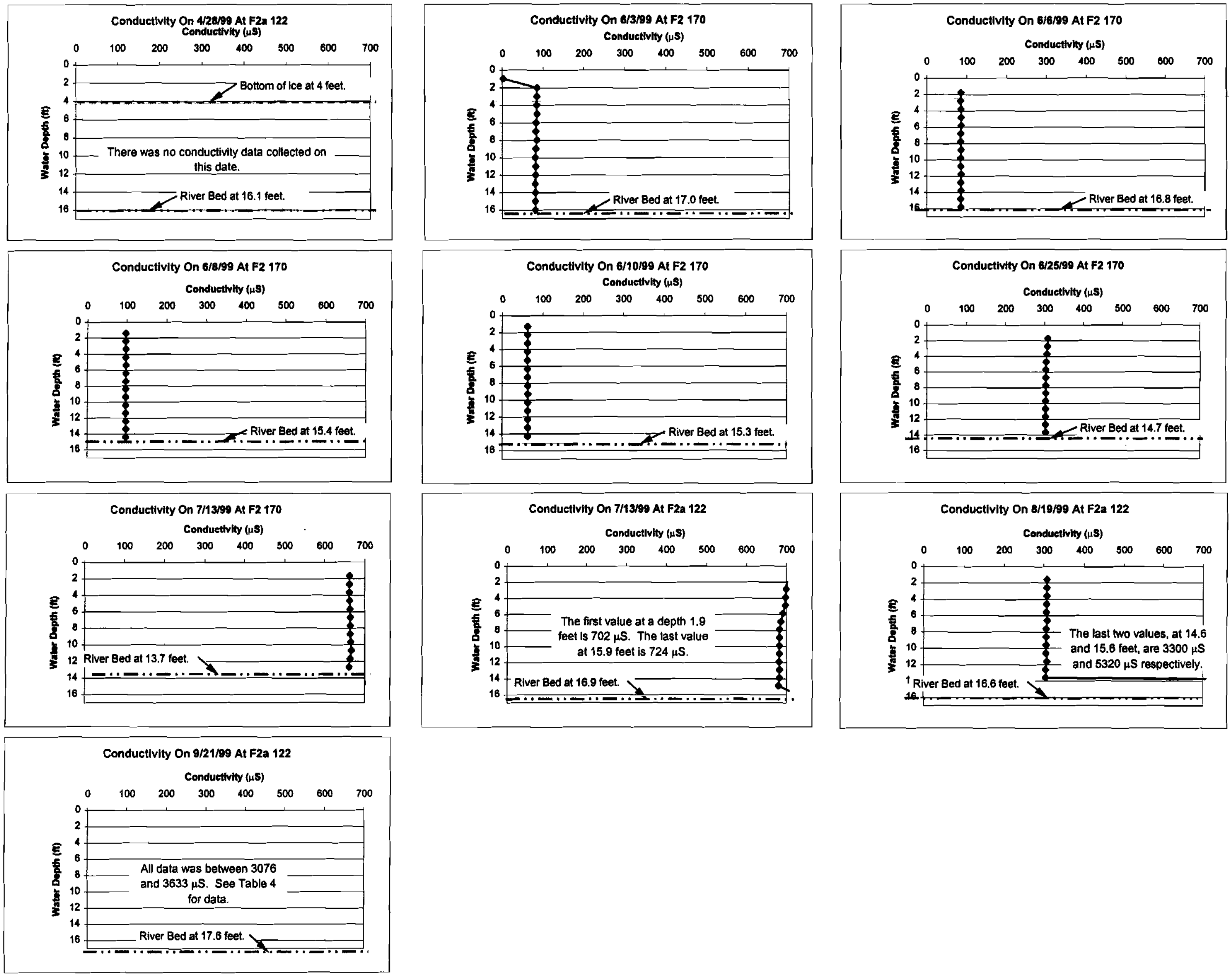
See Appendix A for site locations

Figure C-12b: Sakoonang Channel 1999 Salinity Versus Depth



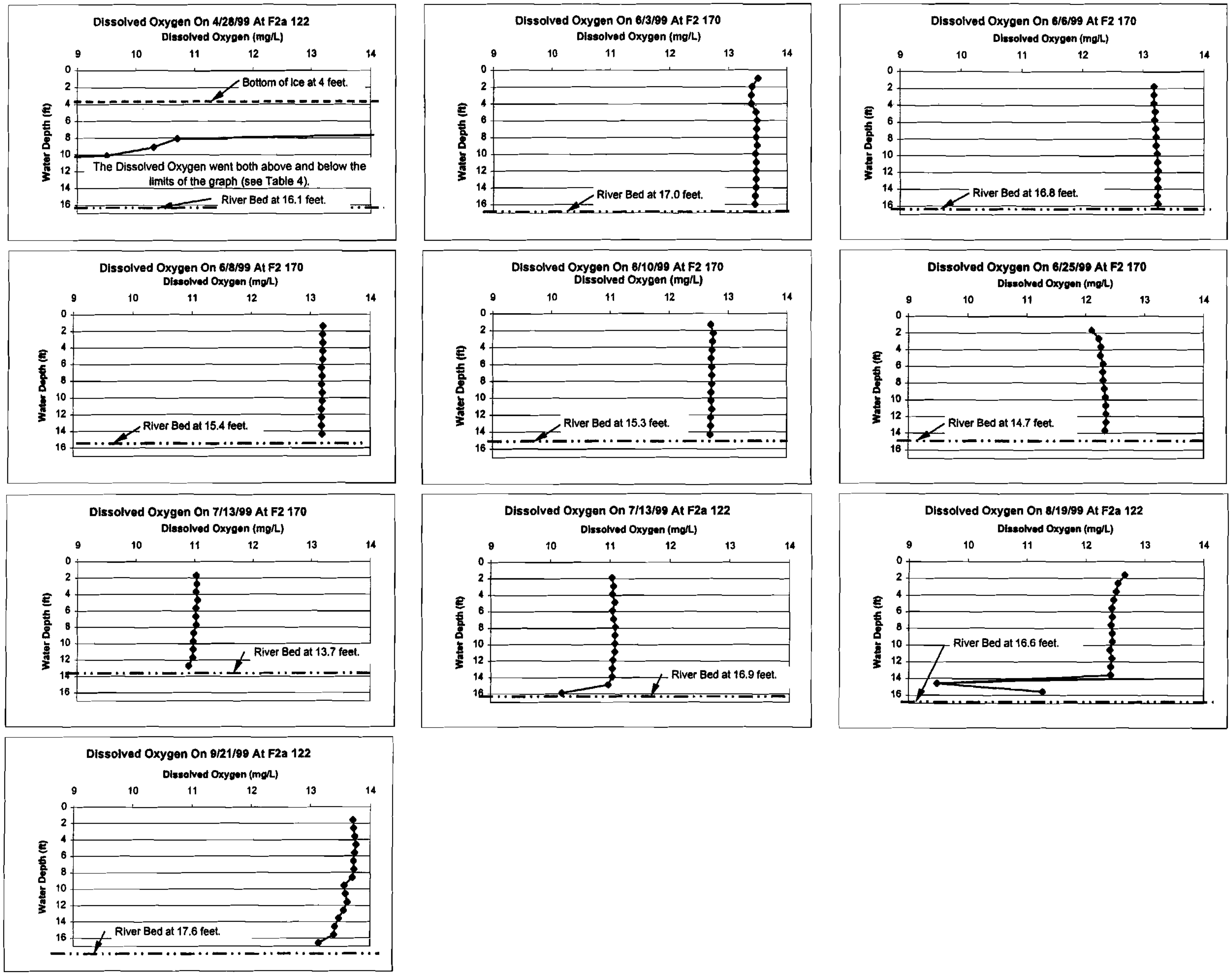
See Appendix A for site locations

Figure C-12c: Sakoonang Channel 1999 Conductivity Versus Depth



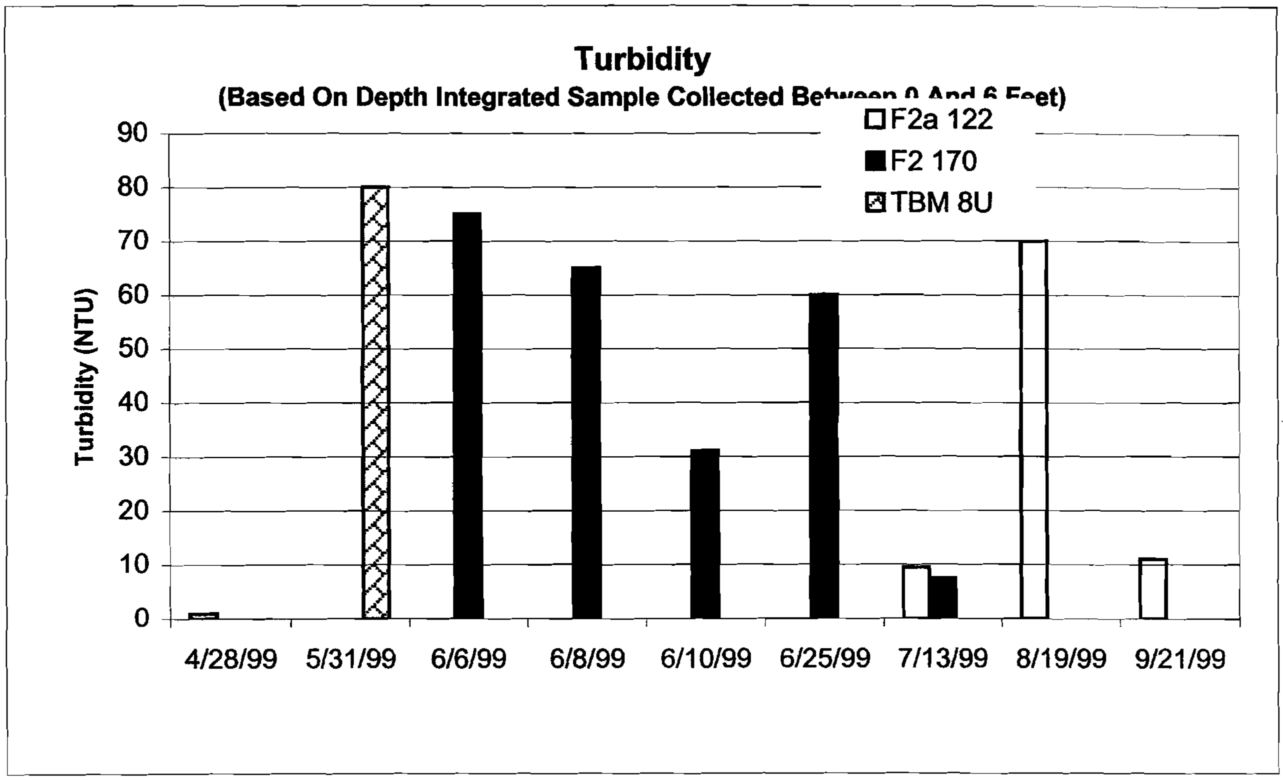
See Appendix A for site locations

Figure C-12d: Sakoonang Channel 1999 Dissolved Oxygen Versus Depth



See Appendix A for site locations

Figure C-12e: Sakoonang Channel 1999 Turbidity And Total Suspended Solids Versus Time



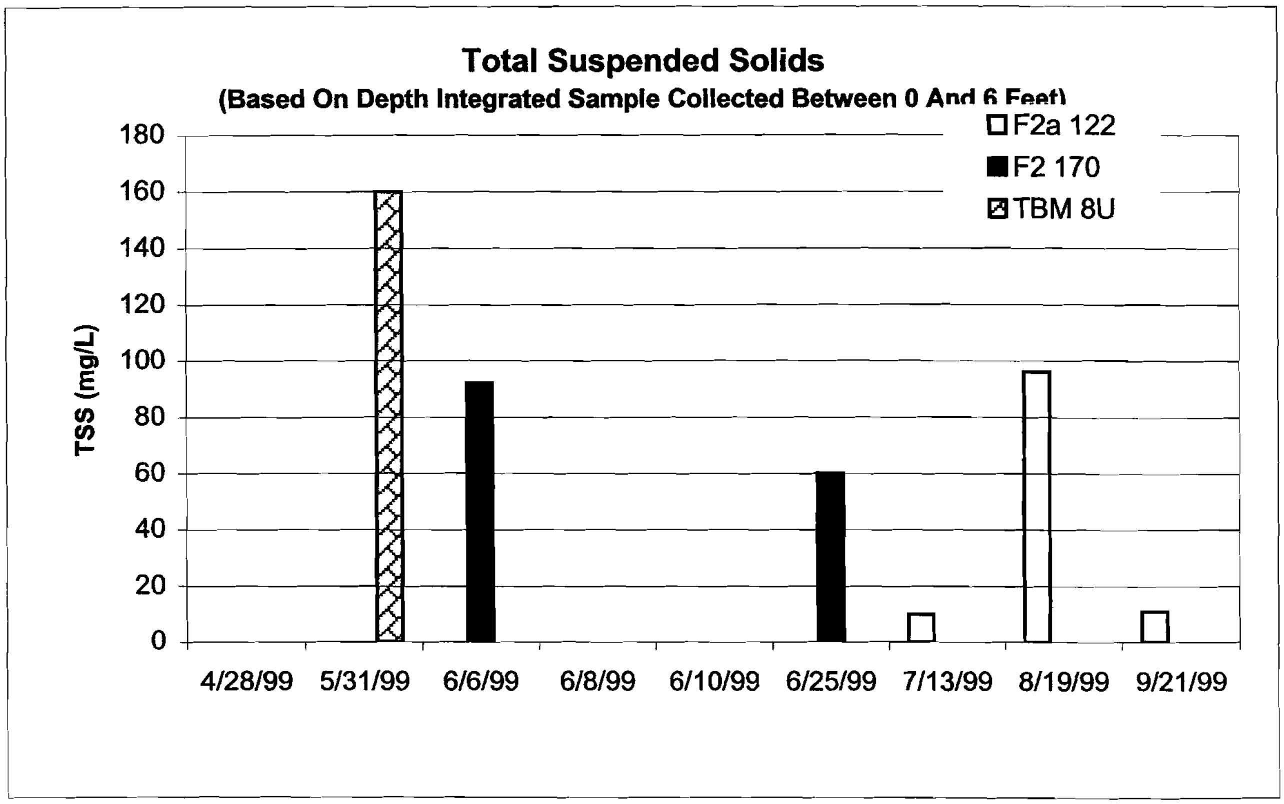
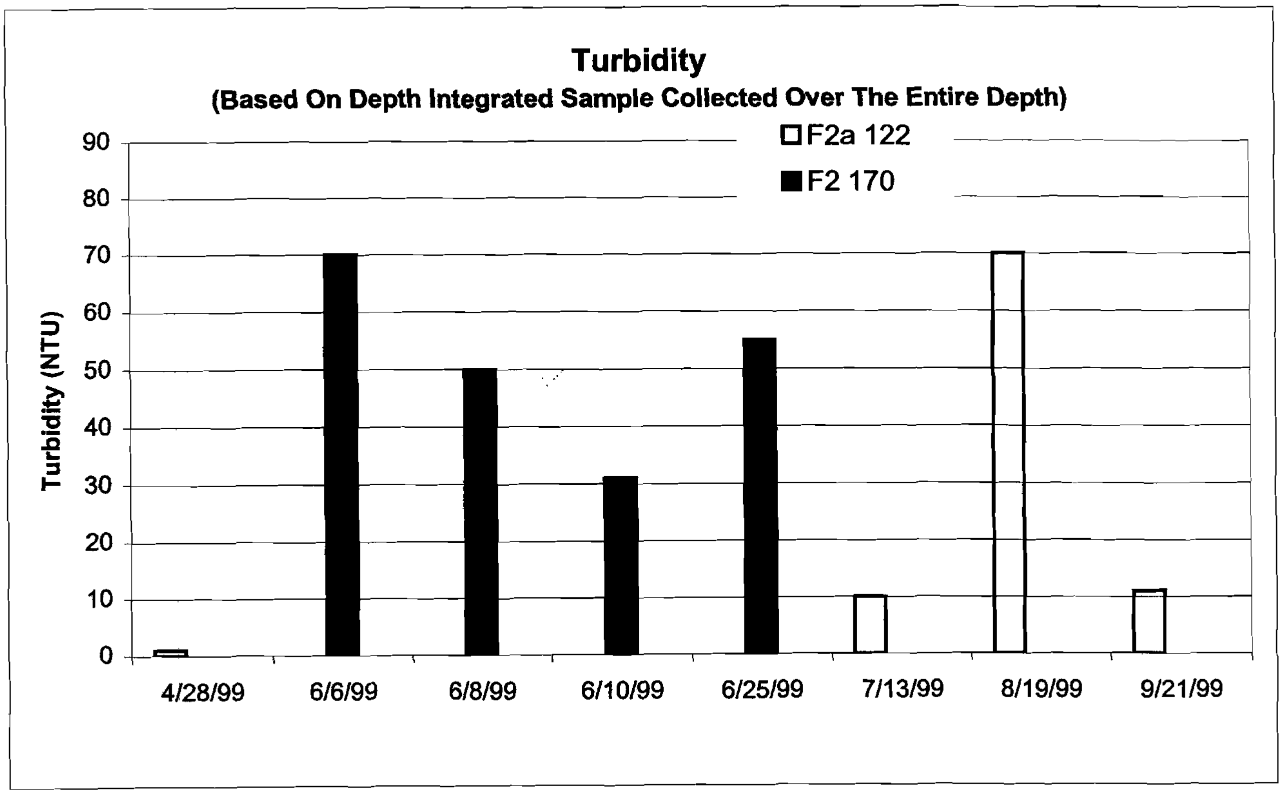


Figure C-12e (Continued): Sakoonang Channel 1999 Turbidity And Total Suspended Solids Versus Time



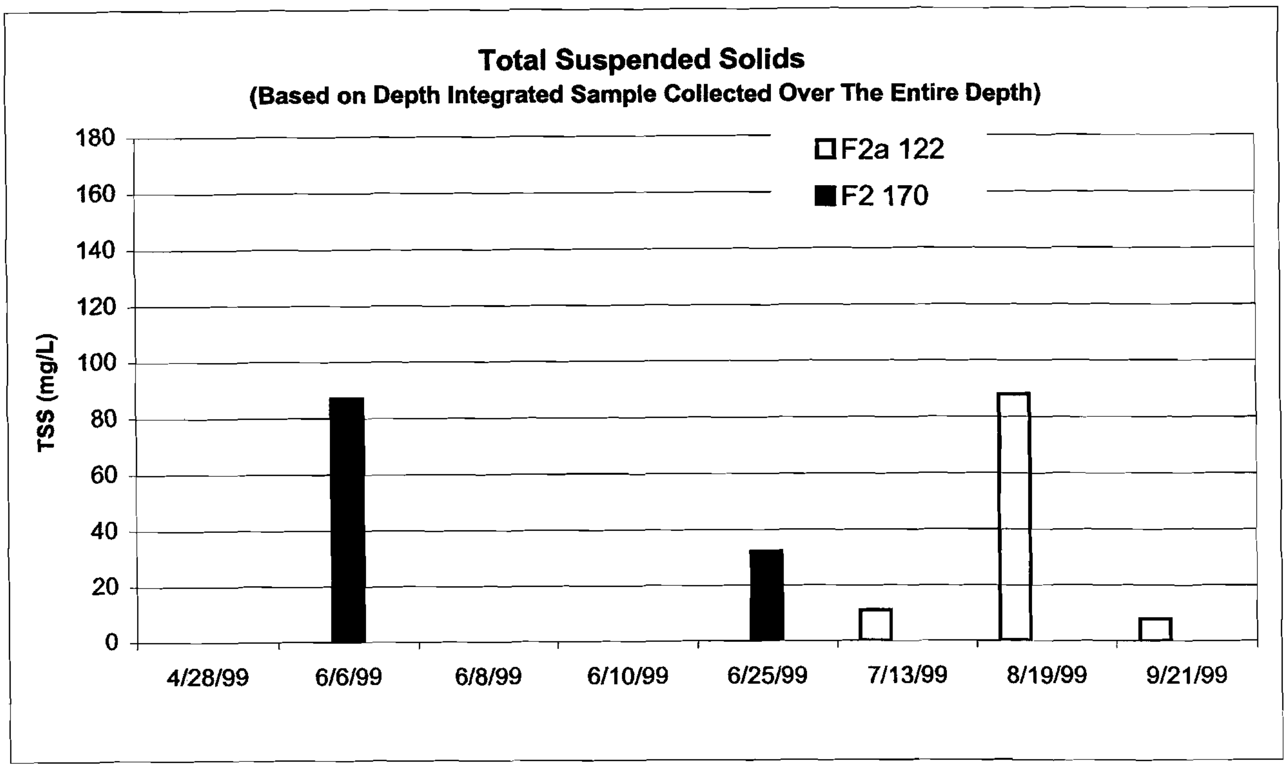


Table C-13: Sakoonang Channel 1999 Secondary Water Quality Parameters

Parameter	Units	ADEC Drinking Water Maximum Contaminant Level (1)	Sampling Date Results (2)			
			6/1/99	7/14/99	8/19/99	9/21/99
Primary Inorganic Chemicals						
Antimony	mg/L	0.006	<0.002	<0.003	<0.003	<0.003
Arsenic	mg/L	0.05	0.003	<0.004	<0.004	<0.004
Barium	mg/L	2	0.0988	0.122	0.139	0.171
Beryllium	mg/L	0.004	<0.0010	<0.0007	<0.0007	<0.0007
Cadmium	mg/L	0.005	0.0001	<0.0001	0.0001	0.0001
Chromium	mg/L	0.1	0.003	<0.002	0.005	0.003
Cyanide	mg/L	0.2	<0.02	<0.02	<0.02	<0.02
Fluoride	mg/L	4.0	<0.06	0.07	<0.06	0.15
Mercury	mg/L	0.002	<0.0002	0.0003	<0.0002	<0.0002
Nickel	mg/L	0.1	<0.02	<0.01	<0.01	<0.01
Nitrate	mg/L	10	0.06	0.06	<0.03	<0.03
Selenium	mg/L	0.05	<0.002	<0.004	<0.004	<0.004
Thallium	mg/L	0.002	<0.001	<0.001	<0.001	<0.001
Secondary Contaminants						
Aluminum	mg/L	0.2	3.11	0.36	3.36	0.35
Chloride	mg/L	250	2.61	218	73.5	1700
Color	Units	15	200	45	150	35
Copper	mg/L	1.0	0.008	0.025	0.009	<0.006
Langelier Index (Corrosivity)	(Unit)	Noncorrosive	-2.0	-0.44	-0.17	-0.09
Fluoride	mg/L	2.0	<0.06	0.07	<0.06	0.15
Foaming agents	mg/L	0.5	<0.10	<0.10	<0.10	<0.10
Iron	mg/L	0.3	5.08	1.26	4.38	1.24
Manganese	mg/L	0.05	0.121	0.114	0.175	0.19
Odor (3)	TON	3	2	2	1	4
pH		6.5 - 8.5	7.3	7.9	8.0	7.9
Silver	mg/L	0.1	0.0001	<0.0002	<0.0002	<0.0002
Sodium	mg/L	250	2.9	1.1	40.9	845
Sulfate	mg/L	250	5.5	31.6	33.9	237
Total Dissolved Solids	mg/L	500	54	558	680	3020
Zinc	mg/L	5	<0.02	<0.007	0.014	<0.007
General Water Quality Parameters						
Calcium	mg/L	(4)	7.92	26.5	32.8	80.2
Alkalinity as CaCO3	mg/L	(4)	21	73	76	82
Hardness as CaCO3	mg/L	(4)	N/A	N/A	134	610
Magnesium	mg/L	(4)	N/A	N/A	12.7	109.9
Volatile Organic Chemical Analysis (5)						
Ethylbenzene	mg/L	0.7	<0.00020	<0.00020	0.00026	<0.00020
Toluene	mg/L	1	<0.00020	0.00046	0.00150	<0.00020
Total Xylene	mg/L	10	<0.00020	0.00041	0.00252	<0.00020
1,2,4-Trimethylbenzene	mg/L	(4)	<0.00020	<0.00020	0.00033	<0.00020
1,3,5-Trimethylbenzene	mg/L	(4)	<0.00020	<0.00020	0.00074	<0.00020

Table C-13: (Continued) Sakoonang Channel 1999 Secondary Water Quality Parameters

Parameter	Units	ADEC Drinking Water Maximum Contaminant Level (1)	Sampling Date Results (2)			
			6/1/99	7/14/99	8/19/99	9/21/99
Total Trihalomethanes						
Total Trihalomethanes	mg/L	0.10	<0.00050	<0.00050	<0.00050	<0.00050
Radioactive Contaminants						
Gross Alpha Radioactivity (6)	pCi/L	15	1.89+/-0.71	ND@1+/-0.46	1.33+/-0.56	N/A
Total Coliform Bacteria (7)						
Total Coliform By Colilert		Not Detected	Detected	Detected	Detected	Detected
Fecal Coliform By Colilert		Not Detected	Detected	Not Detected	Detected	Not Detected
Turbidity (8)						
Turbidity (Field Tested)	NTU	5	80	9.4	70	11

Notes:

1. Alaska Department of Environmental Conservation (ADEC) Drinking Water Maximum Contaminant Levels are listed in the Alaska Drinking Water Regulations (18 AAC 80) as amended through 1 October 1999, except for Aluminum, Foaming Agents and Silver which are from the regulations as amended through 10 November 1994.
2. Shaded areas indicate levels that do not meet the Alaska Drinking Water Regulations.
3. TON - Threshold Odor Number.
4. Parameter is regulated by ADEC but a Maximum Contaminant Level is not specified.
5. Only the parameters within the Volatile Organic Group that had values above the method detection limit during June, July, August or September are presented in the table above. Other Volatile Organics examined include: benzene, bromobenzene, bromochloromethane, bromodichloromethane, bromoform, bromomethane, n-butylbenzene, sec-butylbenzene, tert-butylbenzene, carbon tetrachloride, chlorobenzene (monochlorobenzene), chloroethane, chloroform, chloromethane, 2-chlorotoluene, 4-chlorotoluene, dibromochloromethane, dibromomethane, 1,2-dichlorobenzene (o-dichlorobenzene), 1,3-dichlorobenzene, 1,4-dichlorobenzene (para-dichlorobenzene), dichlorodifluoromethane, 1,1-dichloroethane, 1,2-dichloroethane, 1,1-dichloroethene, cis-1,2-dichloroethene, trans-1,2-dichloroethene, 1,2-dichloropropane,1,3-dichloropropane, 2,2-dichloropropane, 1,1-dichloropropene, cis-1,3-dichloropropene, trans-1,3-dichloropropene, hexachlorobutadiene, isopropylbenzene, p-isopropyltoluene, methylene chloride (dichloromethane), naphthalene, n-propylbenzene, styrene, 1,1,1,2-tetrachloroethane, 1,1,2,2-tetrachloroethane, tetrachloroethene, 1,2,3-trichlorobenzene, 1,2,4-trichlorobenzene, 1,1,1-trichloroethane, 1,1,2-trichloroethane, trichloroethene, trichlorofluoromethane, 1,2,3-trichloropropane, vinyl chloride, 4-bromofluorobenzene, and 1,2-dichlorobenzene-d4.
6. The Gross Alpha Radioactivity is a statistical analysis and is reported as the mean value of the sample and the standard deviation.
7. Three sets of Total Coliform Bacteria were gathered on 8 June 1999 for retesting. Two of the samples (Sak 001 and 002) were split from a single sample collected in the Sakoonang Channel. The third sample (Sak 003) was a blank sample prepared from deionized water. The results were: Sakoonang Channel Sample 001, Total Coliform By Colilert - Detected, Fecal Coliform By Colilert - Not Detected; Sakoonang Channel Sample 002, Total Coliform By Colilert - Detected, Fecal Coliform By Colilert - Detected; and the Blank sample, Total Coliform By Colilert - Not Detected, Fecal Coliform By Colilert - Not Detected.
8. Turbidity is based on a depth integrated sample from 0 to 6 feet.

Table C-13: (Continued) Sakoonang Channel 1999 Secondary Water Quality Parameters

9. Other General Water Quality Parameters examined were depth, temperature, salinity, conductivity, dissolved oxygen, and total suspended solids.
10. The laboratory analyses were performed by Northern Testing Laboratories, Inc.

Table C-14: East Channel 1999 Discharge At River Mile E27.09

Day	Water Surface Elevation at Mon 2 Max (ft)	Min (ft)	Average (ft)	Discharge Max (cfs)	Min (cfs)	Average (cfs)	Volume (Million gpd)	Type of Measure-ment
1-May								
2-May								
3-May								
4-May								
5-May								
6-May								
7-May								
8-May								
9-May								
10-May								
11-May								
12-May								
13-May								
14-May								
15-May								
16-May								
17-May								
18-May								
19-May								
20-May								
21-May								
22-May								
23-May								
24-May								
25-May								
26-May	10.28	8.87	9.58	71600	57700	64600	41800	d
27-May	11.04	10.28	10.81	79200	71600	76900	49700	d
28-May	11.34	11.04	11.11	90900	79200	81000	52400	d
29-May	13.93	11.34	12.14	167300	90900	123000	79500	d
30-May	13.97	11.19	12.63	203000	96300	160000	103000	d
31-May	11.19	9.13	10.19	97600	88000	92500	59800	d
						Total	**386,000**	

Table C-14: (Continued) East Channel 1999 Discharge At River Mile E27.09

Day	Water Surface Elevation at Mon 2			Discharge			Volume	Type of
	Max (ft)	Min (ft)	Average (ft)	Max (cfs)	Min (cfs)	Average (cfs)	(Million gpd)	Measure-ment
1-Jun	9.13	7.36	8.15	99700	89200	95800	61900	d
2-Jun	7.37	6.87	7.02	89200	81800	83900	54200	c
3-Jun	6.93	6.71	6.81	82700	79600	80900	52300	c
4-Jun	7.34	6.76	7.03	88800	80300	84200	54400	c
5-Jun	7.65	7.34	7.52	93700	88800	91600	59200	c
6-Jun	7.35	6.31	6.84	89000	74200	81500	52700	c
7-Jun	6.26	5.79	6.03	73600	67700	70700	45700	c
8-Jun	5.79	5.54	5.62	67700	64800	65800	42500	c
9-Jun	5.86	5.48	5.62	68500	64100	65800	42500	c
10-Jun	6.28	5.86	6.10	73800	68500	71500	46200	c
11-Jun	7.03	6.26	6.60	84000	73500	78100	50500	c
12-Jun	7.22	6.97	7.11	86900	83200	85300	55100	c
13-Jun	6.97	6.21	6.53	83200	72900	77200	49900	c
14-Jun	6.19	5.89	6.01	72600	68900	70400	45500	c
15-Jun	5.96	5.62	5.83	69800	65800	68200	44100	c
16-Jun	5.62	5.07	5.36	65800	59700	62800	40600	c
17-Jun	5.07	4.09	4.51	59700	50300	54200	35000	c
18-Jun	4.11	3.61	3.81	50500	45200	47300	30600	c
19-Jun	3.63	3.52	3.59	45400	44200	45000	29100	c
20-Jun	5.21	3.61	4.50	61200	45200	54100	35000	c
21-Jun	5.23	4.57	5.05	61400	54700	59500	38500	c
22-Jun	4.55	3.15	3.75	54500	40500	46600	30100	c
23-Jun	3.15	2.46	2.74	40500	33600	36400	23500	c
24-Jun	2.46	2.10	2.25	33600	29200	31000	20000	c
25-Jun	2.10	1.78	1.92	29200	25700	27300	17600	c
26-Jun	1.78	1.51	1.64	25700	22000	23800	15400	c
27-Jun	1.70	1.50	1.59	24500	21900	23200	15000	c
28-Jun	1.59	1.28	1.45	23100	19400	21300	13800	c
29-Jun	1.66	1.27	1.45	24000	19200	21300	13800	c
30-Jun	1.50	1.13	1.32	21900	17700	19900	12900	c
						Total	**1,127,600**	

Table C-14: (Continued) East Channel 1999 Discharge At River Mile E27.09

Day	Water Surface Elevation at Mon 2			Discharge			Volume	Type of
	Max (ft)	Min (ft)	Average (ft)	Max (cfs)	Min (cfs)	Average (cfs)	(Million gpd)	Measure-ment
1-Jul	1.31	0.92	1.10	19700	15000	17300	11200	c
2-Jul	1.15	0.83	0.96	18000	13900	15500	10000	c
3-Jul	1.13	0.69	0.86	17800	12500	14300	9240	c
4-Jul	1.02	0.56	0.80	16200	11200	13600	8790	c
5-Jul	0.88	0.40	0.64	14500	8700	12000	7760	c
6-Jul	1.27	0.44	0.88	19300	10200	14700	9500	c
7-Jul	1.16	0.67	0.87	18100	12200	14500	9370	c
8-Jul	1.16	0.72	0.90	18100	12700	14700	9500	c
9-Jul	0.93	0.63	0.75	15000	11800	13100	8470	c
10-Jul	1.46	0.60	0.99	21400	11600	15900	10300	c
11-Jul	1.16	0.63	0.89	18100	11800	14700	9500	c
12-Jul	1.00	0.33	0.68	15900	5900	12200	7880	c
13-Jul	0.72	0.10	0.46	12800	1500	8900	5750	c
14-Jul	0.58	0.01	0.30	11400	900	5600	3620	c
15-Jul	0.40	-0.15	0.15	8900	400	2700	1750	c
16-Jul	1.26	0.15	0.64	19200	2100	11400	7370	c
17-Jul	1.15	0.71	0.94	18000	12600	15300	9890	c
18-Jul	4.32	1.13	1.97	52300	17700	27400	17700	c
19-Jul	8.14	4.43	7.40	102200	53400	91000	58800	c
20-Jul	7.76	6.10	6.88	95600	71500	82300	53200	c
21-Jul	6.08	3.98	4.97	71200	49300	59000	38100	c
22-Jul	3.96	3.36	3.58	49000	42600	44900	29000	c
23-Jul	3.94	3.36	3.59	48900	42600	45000	29100	c
24-Jul	4.11	3.39	3.62	50500	42900	45300	29300	c
25-Jul	3.61	3.33	3.45	45200	42300	43500	28100	c
26-Jul	3.38	2.76	3.11	42800	36600	40200	26000	c
27-Jul	2.71	2.07	2.40	36100	28900	32700	21100	c
28-Jul	2.05	1.57	1.74	28600	22800	25100	16200	c
29-Jul	1.57	1.25	1.41	22800	19100	20900	13500	c
30-Jul	1.46	0.84	1.09	21500	14000	17100	11100	c
31-Jul	1.45	0.82	1.05	21300	13800	16600	10700	c
						Total	**521,800**	

Table C-14: (Continued) East Channel 1999 Discharge At River Mile E27.09

Day	Water Surface Elevation at Mon 2			Discharge			Volume (Million gpd)	Type of Measure-ment
	Max (ft)	Min (ft)	Average (ft)	Max (cfs)	Min (cfs)	Average (cfs)		
1-Aug	1.52	0.69	1.02	22200	12400	16200	10500	c
2-Aug	1.48	0.74	1.22	21700	13000	18700	12100	c
3-Aug	0.98	0.47	0.69	15700	10400	12500	8080	c
4-Aug	0.77	0.29	0.51	13200	4600	9900	6400	c
5-Aug	1.70	0.57	1.04	24600	11300	16600	10700	c
6-Aug	1.87	0.92	1.21	26700	15000	18600	12000	c
7-Aug	1.28	0.81	1.06	19300	13700	16800	10900	c
8-Aug	0.81	0.22	0.54	13700	3100	10500	6790	c
9-Aug	0.71	-0.15	0.29	12600	400	5700	3680	c
10-Aug	2.17	0.59	1.27	30000	11500	19300	12500	c
11-Aug	2.66	2.17	2.39	35600	30000	32600	21100	c
12-Aug	3.15	2.66	2.95	40500	35600	38600	24900	c
13-Aug	3.08	2.75	2.92	39900	36500	38200	24700	c
14-Aug	2.80	2.62	2.70	37000	35200	36000	23300	c
15-Aug	2.83	2.72	2.76	37300	36100	36600	23700	c
16-Aug	2.77	2.45	2.61	36600	33400	35100	22700	c
17-Aug	2.80	2.38	2.51	37000	32600	34100	22000	c
18-Aug	2.81	2.43	2.62	37100	33200	35200	22700	c
19-Aug	2.51	2.39	2.46	34200	32700	33600	21700	c
20-Aug	2.39	1.76	2.04	32700	25400	28600	18500	c
21-Aug	2.10	1.76	1.92	29200	25400	27200	17600	c
22-Aug	1.80	1.19	1.44	26000	18400	21300	13800	c
23-Aug	1.87	1.55	1.72	26700	22600	24800	16000	c
24-Aug	2.16	1.84	1.99	29900	26500	28000	18100	c
25-Aug	1.95	1.60	1.76	27600	23200	25300	16400	c
26-Aug	1.57	1.31	1.42	22900	19700	21000	13600	c
27-Aug	1.68	1.31	1.51	24200	19700	22100	14300	c
28-Aug	1.28	1.03	1.16	19400	16300	18000	11600	c
29-Aug	1.30	1.00	1.11	19600	16000	17400	11200	c
30-Aug	1.28	0.74	1.04	19300	13000	16500	10700	c
31-Aug	0.90	0.60	0.73	14700	11600	12900	8340	c
						Total	**470,600**	

Table C-14: (Continued) East Channel 1999 Discharge At River Mile E27.09

Day	Water Surface Elevation at Mon 2 Max (ft)	Min (ft)	Average (ft)	Discharge Max (cfs)	Min (cfs)	Average (cfs)	Volume (million gpd)	Type of Measurement
1-Sep	1.14	0.70	0.85	17800	12500	14300	9240	c
2-Sep	0.68	0.32	0.50	12300	5600	10200	6590	c
3-Sep	1.32	0.65	1.08	19900	12000	17000	11000	c
4-Sep	1.52	0.87	1.23	22100	14300	18800	12200	c
5-Sep	1.50	0.43	0.94	22000	10000	15400	10000	c
6-Sep	2.15	0.50	1.60	29800	10700	23300	15100	c
7-Sep	2.02	1.70	1.87	28300	24500	26600	17200	c
8-Sep	1.92	1.56	1.74	27200	22700	25000	16200	c
9-Sep	1.55	1.32	1.44	22600	19800	21200	13700	c
10-Sep	1.50	1.24	1.36	22000	18900	20300	13100	c
11-Sep	1.49	1.13	1.32	21800	17700	19900	12900	c
12-Sep	1.82	1.27	1.50	26200	19300	22100	14300	c
13-Sep	1.57	1.23	1.45	22900	18800	21400	13800	c
14-Sep	1.46	1.15	1.28	21400	18000	19400	12500	c
15-Sep	1.17	0.96	1.05	18200	15500	16600	10700	c
16-Sep	1.84	1.11	1.53	26400	17400	22500	14500	c
17-Sep	2.22	1.80	2.01	30600	26000	28200	18200	c
18-Sep	2.17	1.74	2.01	30100	25100	28200	18200	c
19-Sep	1.74	1.46	1.56	25100	21500	22700	14700	c
20-Sep	1.69	1.27	1.42	24400	19200	21000	13600	c
21-Sep	2.02	1.70	1.88	28300	24600	26700	17300	c
22-Sep	2.49	1.95	2.14	34000	27600	29800	19300	c
23-Sep	3.72	2.49	2.91	46400	34000	38200	24700	c
24-Sep	4.27	3.45	3.92	51900	43500	48400	31300	c
25-Sep	3.45	2.49	3.00	43500	33900	39000	25200	c
26-Sep								
27-Sep								
28-Sep								
29-Sep								
30-Sep								
						Total	**385,500**	

Notes:

1. Two types of measurements were used. Discrete water surface elevation measurements are designated by a "d". The number of measurements per day varied from one to five. Continuous water surface elevation measurements are designated by a "c". The instrument used to obtain the continuous measurements records 1 minute averages of water depth above the instrument every 10 minutes, throughout the day.
2. Observations of water surface elevation and flow began on May 26, 1999.

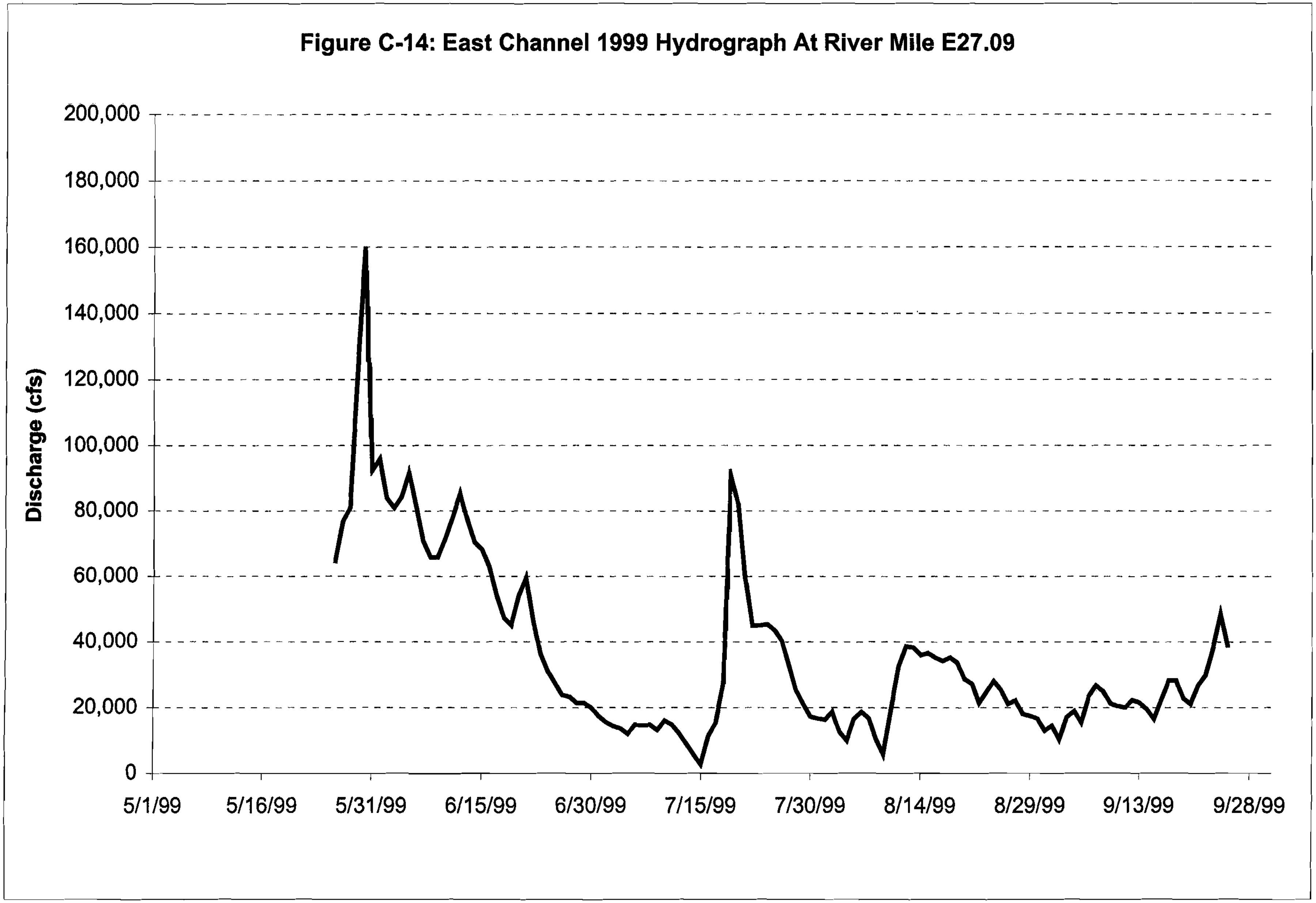


Figure C-14: East Channel 1999 Hydrograph At River Mile E27.09
Discharge (cfs)
200,000
180,000
160,000
140,000
120,000
100,000
80,000
60,000
40,000
20,000
0
5/1/99
5/16/99
5/31/99
6/15/99
6/30/99
7/15/99
7/30/99
8/14/99
8/29/99
9/13/99
9/28/99

APPENDIX D

LAKE 93-12 AND LAKE 93-13 WATER SUPPLY RISK ASSESSMENT

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Methods

Data

Meteorological data collected at Kuparuk between 1986 to 1998 were used to conduct a water supply risk assessment of Lakes 93-12 and 93-13. The Kuparuk data consisted of maximum snow on ground in May, summer precipitation and summer evaporation rates, and is presented in Table D-1.

Evaporation Rate Verification

To confirm the expected similarity in evaporation rates between Kuparuk and the Alpine Development (Alpine), data collected near Alpine was used to estimate the evaporation rates on Lakes 93-12 and 93-13 during the 1999 open water season. The evaporation rates estimated for the 1999 season at Alpine were compared to the lake evaporation rates developed for Kuparuk based on measured pan evaporation rates at Kuparuk (Table D-1).

The 1999 evaporation rates from Lakes 93-12 and 93-13 were calculated using data from the period 7 July to 25 September 1999. They were calculated as the difference between the net water volume change (calculated from changes in water surface elevation) and the sum of precipitation (Nuiqsut weather data, US National Weather Service, 1999) and artificial water withdrawal (Donnelly, 1999). A summary of the computations and results are presented in Tables D-2 and D-3.

Evaporation rates of 1.5 and 1.4 mm/day were calculated for Lakes 93-12 and 93-13, respectively. These rates compare favorably to the Kuparuk open water annual average evaporation rate of 1.9 mm/day, and the observed range of 0.9 to 2.7 mm/day (Rate of Lake Evaporation @ Kuparuk, Table D-1).

Water Supply Risk Assessment

A spreadsheet model, utilizing a Monte Carlo statistical technique (Haan, 1979) was developed to simulate annual fluctuations in Lakes 93-12 and 93-13, and to estimate the percentage of years during the life of Alpine when the expected water demands would be met. The model uses statistical distributions of the annual water volume associated with flooding by the river, snowmelt, summer precipitation and evaporation, and computes the volume of water available for use by Alpine on an annual basis. Because the magnitude of the meteorological parameters and the occurrence of river flooding vary randomly, the model is run through the entire economic life of the project (30 years) 100,000 times. The result is an estimate of the probability of meeting the expected water demand during the first 7 years of operations, when the water demand is expected to be particularly high, and during the next 23 years, when the water demand is expected to be significantly less (Figure D-1).

The frequency of flooding used by the model was determined from breakup observations in years 1995, 1996, 1998, and 1999. The data indicates that the lakes are likely to be flooded approximately once every four years. Thus, the model randomly selects whether or not a flood occurs based on a 25 percent probability that a flood will occur in any given year.

Lakes were flooded in 2000, so that makes twice in five years 40% rather than 25%. Small sample. Could be either.

The snowmelt, summer precipitation, and evaporation parameters were created by applying the Kuparuk data to Lakes 93-12 and 93-13. The specific procedures used to create the parameters are as follows. First, annual water volumes associated with each parameter were estimated by multiplying the magnitude of each parameter by the surface area of each lake as described in Tables D-4 and D-5. Secondly, the water volume associated with each parameter, for each year in which data are available, were combined to provide a single value for each parameter in each year. The mean and standard deviation associated with each of these parameters was used in a lognormal distribution to provide the values used by the model, as described in Table D-6.

Results

A report of the model results for years 2000-2006 is presented in Attachment D-1. A report of the model results for years 2007-2029 is presented in Attachment D-2.

Table D-1: Snow/Water Equivalent, Summer Precipitation, and Evaporation at Kuparuk

Year	SNOW			SUMMER PRECIP		SUMMER EVAPORATION		
	Max. Snow on Ground in May @ Kuparuk (1)		**Water Equivalent (2)**	**May 15 - Sept 15 Precipitation @ Kuparuk (3)**		May 15 - Sept 15 Rate of Pan Evap. @ Kuparuk (1)	Rate of Lake Evap. @ Kuparuk (4)	**Total Lake Evaporation (5)**
	(Inches)	(mm)	**(mm)**	(Inches)	**(mm)**	(mm/day)	(mm/day)	**(mm)**
1986	12	305	**85**	1.73	**43.9**	2.8	1.7	**136**
1987	6	152	**43**	1.79	**45.5**	2.9	1.8	**144**
1988	2	51	**14**	2.29	**58.2**	3.0	1.8	**144**
1989	13	330	**92**	3.98	**101.1**	3.8	2.3	**184**
1990	3	76	**21**	1.96	**49.8**	4.5	2.7	**216**
1991	8	203	**57**	2.17	**55.1**	2.9	1.8	**144**
1992	4	102	**28**	2.23	**56.6**	3.2	1.9	**152**
1993	4	102	**28**	2.22	**56.4**	2.9	1.8	**144**
1994	8	203	**57**	4.36	**110.7**	3.1	1.9	**152**
1995	3	76	**21**	3.07	**78.0**	2.7	1.6	**128**
1996	12	305	**85**	2.42	**61.5**	2.9	1.8	**144**
1997	9	229	**64**	3.33	**84.6**	3.8	2.3	**184**
1998	10	254	**71**	2.49	**63.2**	1.5	0.9	**72**

Notes:
1. Data obtained from the National Weather Service.
2. A Water equivalent coefficient of 0.28 (Stern, 1999) was used to convert snow depth to water equivalent.
3. Data obtained from the National Weather Service. May 15 to September 15 represents the time when precipitation is most likely to fall as rain and not snow, and is therefore considered independent from the snowpack.
4. Lake Evaporation was computed based on the measured pan evaporation and an average pan evaporation coefficient of 0.61. The average pan evaporation coefficient (0.61) was developed from data collected on the North Slope by Kane and Carlson (1973) in 1973 and by ABR (Cater, 1999) in 1996.
5. Total lake evaporation is based on an 80-day summer, July 1st to September 15th. Lakes are assumed to be ice-free during this period and evaporation is assumed to only occur when lakes are ice-free.

Table D-2: Lake 93-12 1999 Evaporation Rates

Total Precipitation (1) (in)	(ft)	Raw Water Metered Withdrawal (2) (gal)	Change in Water Surface Elevation (3) (ft)	Volume of Precip On Lake (4) (gal)	Volume of Precip Runoff Into Lake (5) (gal)	Water Balance (Precip minus Withdrawal) (gal)	Volume Change In Lake Based On Staff Gage Readings (gal)
2.406	0.2005	0	-0.13	6,533,304	1,773,036	8,306,340	-4,236,058

Lake Evaporation (6) -12,542,398 gallons

Over the period of July 7 to Sept. 25 the evaporation rate equals (inches/day) 0.06
(mm/day) 1.5

Notes:

1. Nuiqsut precipitation data obtained from the National Weather Service. Value is the total precipitation over the analysis period July 7th to September 25th. This time frame represents the ice-free period of lake data.
2. Metered raw water withdrawal information supplied by Shannon Donnelly (1999)
3. The net difference in water surface elevation from July 7th to September 25th.
4. The lake surface area equals 100 acres (4,356,000 SQFT) (Moulton, 1997). The volume equals total precipitation x lake surface area.
5. The drainage area (minus the lake surface area) equals 73.4 acres (3,197,000 SQFT) estimated by Michael Baker Jr., Inc. The volume equals total precipitation x drainage area x 0.37 (Kane, et al., 1999).
6. The total evaporation over the study period equals the difference between the lake water balance and the change in water volume based on staff gage measurements.

Table D-3: Lake 93-13 1999 Evaporation Rates

Total Precipitation (1) (in)	(ft)	Raw Water Metered Withdrawal (2) (gal)	Change in Water Surface Elevation (3) (ft)	Volume of Precip On Lake (4) (gal)	Volume of Precip Runoff Into Lake (5) (gal)	Water Balance (Precip minus Withdrawal) (gal)	Volume Change In Lake Based On Staff Gage Readings (gal)
2.419	0.2113	4,192,800	-0.26	4,741,889	2,110,995	2,660,084	-5,834,790

Lake Evaporation (6) -8,494,874 gallons

Over the period of July 7 to Sept. 25 the evaporation rate equals (inches/day) 0.06
(mm/day) 1.4

Notes:
1. Nuiqsut precipitation data obtained from the National Weather Service. Value is the total precipitation over the analysis period July 7th to September 25th. This time frame represents the ice-free period of lake data.
2. Metered raw water withdrawal information supplied by Shannon Donnelly (1999)
3. The net difference in water surface elevation from July 7th to September 25th.
4. The lake surface area equals 69 acres (3,006,000 SQFT) (Moulton, 1997). The volume equals total precipitation x lake surface area.
5. The drainage area (minus the lake surface area) equals 82.9 acres (3,610,,000 SQFT) estimated by Michael Baker Jr., Inc. The volume equals total precipitation x drainage area x 0.37 (Kane, et al., 1999).
6. The total evaporation over the study period equals the difference between the lake water balance and the change in water volume based on staff gage measurements.

Table D-4: Lake 93-12 Estimated Annual Water Volume Fluctuations (excluding river flooding)

Year	SNOW MELT				SUMMER PRECIPITATION				LAKE EVAPORATION	
	Water Equivalent of Snow (4)	Snowmelt Directly on Lake (5)	Snowmelt Runoff Into Lake (6)	**Total Snowmelt**	May 15 - Sept 15 Precipitation @ Kuparuk (4)	Precipitation Directly Into Lake	Precipitation Runoff Into Lake (7)	**Total Precipitation**	**Estimated Lake Evaporation (8)**	
	(mm)	(Gallons)	(Gallons)	**(Gallons)**	(mm)	(Gallons)	(Gallons)	**(Gallons)**	(mm)	**(Gallons)**
1986	85	9,123,687	4,482,941	**13,606,628**	44	4,697,613	1,274,667	**5,972,280**	136	**14,539,059**
1987	43	4,561,844	2,241,470	**6,803,314**	45	4,860,536	1,318,875	**6,179,411**	144	**15,394,298**
1988	14	1,520,615	747,157	**2,267,771**	58	6,218,227	1,687,276	**7,905,503**	144	**15,394,298**
1989	92	9,883,994	4,856,519	**14,740,514**	101	10,807,225	2,932,471	**13,739,696**	184	**19,670,492**
1990	21	2,280,922	1,120,735	**3,401,657**	50	5,322,151	1,444,131	**6,766,282**	216	**23,091,447**
1991	57	6,082,458	2,988,627	**9,071,085**	55	5,892,381	1,598,860	**7,491,241**	144	**15,394,298**
1992	28	3,041,229	1,494,314	**4,535,543**	57	6,055,304	1,643,068	**7,698,372**	152	**16,249,537**
1993	28	3,041,229	1,494,314	**4,535,543**	56	6,028,150	1,635,700	**7,663,850**	144	**15,394,298**
1994	57	6,082,458	2,988,627	**9,071,085**	111	11,839,070	3,212,456	**15,051,526**	152	**16,249,537**
1995	21	2,280,922	1,120,735	**3,401,657**	78	8,336,226	2,261,981	**10,598,207**	128	**13,683,820**
1996	85	9,123,687	4,482,941	**13,606,628**	61	6,571,227	1,783,060	**8,354,287**	144	**15,394,298**
1997	64	6,842,765	3,362,206	**10,204,971**	85	9,042,226	2,453,550	**11,495,776**	184	**19,670,492**
1998	71	7,603,073	3,735,784	**11,338,857**	63	6,761,304	1,834,636	**8,595,940**	72	**7,697,149**

Notes:

1. Total drainage area including lake surface estimated at 173.4 acres (7,553,000 SQFT) by Michael Baker Jr., Inc.
2. Lake surface area equals 100 acres (4,356,000 SQFT), (Moulton, 1997)
3. The lake runoff area equals 73.4 acres (3,197,000 SQFT) and is the difference between the total drainage area and the lake surface area.
4. Values from Table D-1.
5. "Snowmelt directly on lake" represents the snowpack water volume that accumulates directly on the lake surface and does not include the snowmelt runoff on the ground draining to the lake.
6. The coefficient of 0.67 was used to calculate the water volume resulting from snowmelt runoff on the drainage basin (Kane, et al., 1999).
7. A runoff coefficient of 0.37 was used to calculate the runoff volume resulting from precipitation on the ground draining to the lake (Kane, et al.,1999).
8. The estimated lake evaporation in millimeters was taken from Table D-1 and the volumes were calculated based on the lake surface area.

Table D-5: Lake 93-13 Estimated Annual Water Volume Fluctuations (excluding river flooding)

Year	SNOW MELT				SUMMER PRECIPITATION				LAKE EVAPORATION	
	Water Equivalent of Snow (4)	Snowmelt Directly on Lake (5)	Snowmelt Runoff Into Lake (6)	**Total Snowmelt**	May 15 - Sept 15 Precipitation @ Kuparuk (4)	Precipitation Directly Into Lake	Precipitation Runoff Into Lake (7)	**Total Precipitation**	**Estimated Lake Evaporation (8)**	
	(mm)	(Gallons)	(Gallons)	**(Gallons)**	(mm)	(Gallons)	(Gallons)	**(Gallons)**	(mm)	**(Gallons)**
1986	85	6,295,345	5,065,368	**11,360,712**	44	3,241,353	1,440,273	**4,681,626**	136	**10,031,952**
1987	43	3,147,672	2,532,684	**5,680,356**	45	3,353,770	1,490,224	**4,843,994**	144	**10,622,067**
1988	14	1,049,224	844,228	**1,893,452**	58	4,290,577	1,906,488	**6,197,065**	144	**10,622,067**
1989	92	6,819,957	5,487,482	**12,307,438**	101	7,456,986	3,313,460	**10,770,445**	184	**13,572,641**
1990	21	1,573,836	1,266,342	**2,840,178**	50	3,672,284	1,631,754	**5,304,038**	216	**15,933,100**
1991	57	4,196,896	3,376,912	**7,573,808**	55	4,065,743	1,806,585	**5,872,328**	144	**10,622,067**
1992	28	2,098,448	1,688,456	**3,786,904**	57	4,178,160	1,856,536	**6,034,697**	152	**11,212,181**
1993	28	2,098,448	1,688,456	**3,786,904**	56	4,159,424	1,848,211	**6,007,635**	144	**10,622,067**
1994	57	4,196,896	3,376,912	**7,573,808**	111	8,168,959	3,629,820	**11,798,779**	152	**11,212,181**
1995	21	1,573,836	1,266,342	**2,840,178**	78	5,751,997	2,555,860	**8,307,856**	128	**9,441,837**
1996	85	6,295,345	5,065,368	**11,360,712**	61	4,534,147	2,014,717	**6,548,864**	144	**10,622,067**
1997	64	4,721,509	3,799,026	**8,520,534**	85	6,239,136	2,772,317	**9,011,453**	184	**13,572,641**
1998	71	5,246,121	4,221,140	**9,467,260**	63	4,665,300	2,072,994	**6,738,294**	72	**5,311,033**

Notes:
1. Total drainage area including lake surface estimated at 151.9 acres (6,616,000 SQFT) by Michael Baker Jr., Inc.
2. Lake surface area equals 69 acres (3,006,000 SQFT), (Moulton, 1997)
3. The lake runoff area equals 82.9 acres (3,610,000 SQFT) and is the difference between the total drainage area and the lake surface area.
4. Values from Table D-1.
5. "Snowmelt directly on lake" represents the snowpack water volume that accumulates directly on the lake surface and does not include the snowmelt runoff on the ground draining to the lake.
6. The coefficient of 0.67 was used to calculate the water volume resulting from snowmelt runoff on the drainage basin (Kane, et al., 1999).
7. A runoff coefficient of 0.37 was used to calculate the runoff volume resulting from precipitation on the ground draining to the lake (Kane, et al.,1999).
8. The estimated lake evaporation in millimeters was taken from Table D-1 and the volumes were calculated based on the lake surface area.

Table D-6: Snowmelt, Summer Precipitation, And Evaporation Data Used In The Risk Assessment Model

Year	SNOW MELT			SUMMER PRECIPITATION			LAKE EVAPORATION		
	Lake 93-12 Snowmelt (1)	Lake 93-13 Snowmelt (2)	**Combined Snowmelt**	Lake 93-12 Summer Precipitation (1)	Lake 93-13 Summer Precipitation (2)	**Combined Summer Precipitation**	Lake 93-12 Evaporation (1)	Lake 93-13 Evaporation (2)	**Combined Evaporation**
	(Gallons)	(Gallons)	**(Gallons)**	(Gallons)	(Gallons)	**(Gallons)**	(Gallons)	(Gallons)	**(Gallons)**
1986	13,606,628	11,360,712	**24,967,340**	5,972,280	4,681,626	**10,653,906**	14,539,059	10,031,952	**24,571,011**
1987	6,803,314	5,680,356	**12,483,670**	6,179,411	4,843,994	**11,023,405**	15,394,298	10,622,067	**26,016,364**
1988	2,267,771	1,893,452	**4,161,223**	7,905,503	6,197,065	**14,102,569**	15,394,298	10,622,067	**26,016,364**
1989	14,740,514	12,307,438	**27,047,952**	13,739,696	10,770,445	**24,510,141**	19,670,492	13,572,641	**33,243,132**
1990	3,401,657	2,840,178	**6,241,835**	6,766,282	5,304,038	**12,070,321**	23,091,447	15,933,100	**39,024,547**
1991	9,071,085	7,573,808	**16,644,894**	7,491,241	5,872,328	**13,363,569**	15,394,298	10,622,067	**26,016,364**
1992	4,535,543	3,786,904	**8,322,447**	7,698,372	6,034,697	**13,733,069**	16,249,537	11,212,181	**27,461,718**
1993	4,535,543	3,786,904	**8,322,447**	7,663,850	6,007,635	**13,671,486**	15,394,298	10,622,067	**26,016,364**
1994	9,071,085	7,573,808	**16,644,894**	15,051,526	11,798,779	**26,850,305**	16,249,537	11,212,181	**27,461,718**
1995	3,401,657	2,840,178	**6,241,835**	10,598,207	8,307,856	**18,906,064**	13,683,820	9,441,837	**23,125,657**
1996	13,606,628	11,360,712	**24,967,340**	8,354,287	6,548,864	**14,903,151**	15,394,298	10,622,067	**26,016,364**
1997	10,204,971	8,520,534	**18,725,505**	11,495,776	9,011,453	**20,507,229**	19,670,492	13,572,641	**33,243,132**
1998	11,338,857	9,467,260	**20,806,117**	8,595,940	6,738,294	**15,334,234**	7,697,149	5,311,033	**13,008,182**
		Mean (3)	**15.04**		**Mean (3)**	**16.13**		**Mean (3)**	**27.02**
		Standard Deviation (3)	**7.98**		**Standard Deviation (3)**	**5.08**		**Standard Deviation (3)**	**6.09**

Notes:
1. Values from Table D-4.
2. Values from table D-5
3. The mean and standard deviation are presented in units of million gallons.

Figure D-1: Risk Assessment Spreadsheet and Assumptions

Year (1)	Annual Water Requirement (2) (MG)	Flood Test (3)	Flood Year (4)	Snow Melt (5) (MG)	Summer Precipitation (6) (MG)	Evaporation (7) (MG)	Supply Balance (8) (MG)	Counter (9)
							36.2	
2000	34.16				16.79	17.08	1.8	1
2001	30.48	0.12	TRUE	8.48	17.26	17.86	5.1	1
2002	21.89	3.31	FALSE	9.87	17.48	20.92	(10.3)	0
2003	21.89	1.24	FALSE	12.22	31.61	18.30	3.6	1
To								
2028	10.00	2.50	FALSE	8.83	11.33	26.28	(16.1)	0
2029	10.00	0.92	TRUE	13.00	12.85	26.31	12.7	1
							Total Years with Sufficient Supply (10)	4

Notes:

1. Model runs all 30 years (2000-2029) concurrently.
2. Annual water demands in the years 2000-2006 provided by Powell (Powell, 1999). Annual water demands in the years 2007-2029 assumed at 10 MG annually.

Year	Water Estimate
2000	34.16 MG
2001	30.48 MG
2002	21.89 MG
2003	21.89 MG
2004	21.89 MG
2005	9.97 MG
2006	10.07 MG
2007-2029	10.00 MG

3. Model variable that generates a random number between 0 and 4.
4. Based on available data it is assumed that there is a 25% probability that the lakes will be flooded in any given year. Flood year is "true" (indicating flood did occur) if the flood test random number is less than or equal to 1. Flood year is "false" (indicating flood did not occur) if flood test is greater than 1 or less than or equal to 4.
5. Model variable defining snowmelt for a given year. The distribution of the variable is assumed to be lognormal, with a mean of 15.04 MG and a standard deviation of 7.98 based on Kuparuk data. The data is the combined total of both Lakes 93-12 and 93-13. Snowmelt does not effect the available water supply on years of flooding based on the assumption that flooding causes the lakes to reach maximum levels.
6. Model variable defining summer precipitation for a given year. The distribution of the variable is assumed to be lognormal, with a mean of 16.13 MG and a standard deviation of 5.08 based on Kuparuk data. The data is the combined total of both Lakes 93-12 and 93-13.
7. Model variable defining evaporation for a given year. The distribution of the variable is assumed to be lognormal, with a mean of 27.02 MG and a standard deviation of 6.09 based on Kuparuk data. The data is the combined total of both Lakes 93-12 and 93-13.
8. The supply balance is the remaining supply after yearly withdrawal for facility use. The model uses the following logic:
    a. The lakes are assumed full in the spring of 2000. When the lakes are full the available supply is 36.2 MG. This is the combined usable volume of Lakes 93-12 and 93-13 as set by the regulatory

Figure D-1 (Continued): Risk Assessment Spreadsheet and Assumptions

agencies.

b. The model tests for flood year. If flood year is true, the lakes are assumed full and the supply balance is calculated accordingly. The supply balance then equals 36.2 - annual water requirement + summer precipitation - evaporation.

c. If flood year is false, the model checks the supply balance from the previous year. If the previous years supply balance is positive, the new supply balance equals the previous years supply balance + snowmelt + summer precipitation - evaporation - the annual water requirement. If the previous years supply balance is negative the previous years supply balance is then set to zero and the new supply balance equals zero + snowmelt + summer precipitation - evaporation - the annual water requirement. This assumes that no more than the regulatory limit is ever allowed to be withdrawn from the lakes.

9. The counter equals "1" if years supply balance is positive, indicating there was a sufficient water volume to meet the demands of Alpine. The counter equals "0" if years supply is negative, indicating the water supply fell below the allowable volume.

10. Model forecast variable predicting the total number of years with sufficient supply in a given trial. It is the sum of the counter column. The model has two counters, the first is for years 2000-2006 and the second is for years 2007-2029.

Attachment D-1

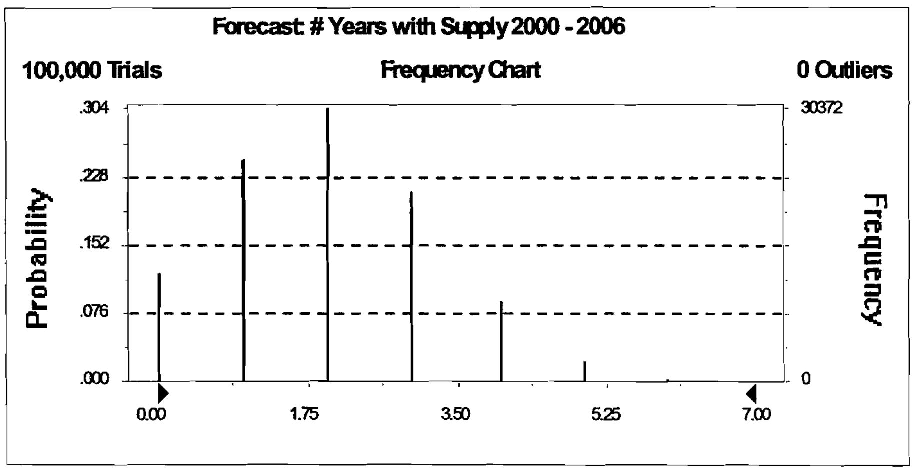
Years 2000-2006 Water Supply Risk Assessment Model Results

Crystal Ball Report
Simulation started on 4/27/00 at 17:47:35
Simulation stopped on 4/27/00 at 20:02:03

Forecast: # Years with Supply 2000 - 2006 **Cell: J13**

Summary:
Display Range is from 0.00 to 7.00
Entire Range is from 0.00 to 7.00
After 100,000 Trials, the Std. Error of the Mean is 0.00

Statistics:	Value
Trials	100000
Mean	1.98
Median	2.00
Mode	2.00
Standard Deviation	1.25
Variance	1.57
Skewness	0.33
Kurtosis	2.73
Coeff. of Variability	0.63
Range Minimum	0.00
Range Maximum	7.00
Range Width	7.00
Mean Std. Error	0.00



Years 2000-2006 Water Supply Risk Assessment Model Results

Forecast: # Years with Supply 2000 - 2006 (cont'd) **Cell: J13**

Percentiles:

Percentile	Value
0%	0.00
10%	0.00
20%	1.00
30%	1.00
40%	2.00
50%	2.00
60%	2.00
70%	3.00
80%	3.00
90%	4.00
100%	7.00

Frequency Counts:

Frequency:

	Start Value	End Value	Prob.	Freq.
	0	0	12.18%	12182
	1	1	24.64%	24640
	2	2	30.37%	30372
	3	3	21.22%	21220
	4	4	8.90%	8903
	5	5	2.35%	2348
	6	6	0.31%	313
	7	7	0.02%	22
Total:			100.00%	100000

Cumulative:

Start Value	End Value	Prob.	Freq.
0	0	12.18%	12182
1	1	36.82%	36822
2	2	67.19%	67194
3	3	88.41%	88414
4	4	97.32%	97317
5	5	99.67%	99665
6	6	99.98%	99978
7	7	100.00%	100000

End of Forecast

Attachment D-1

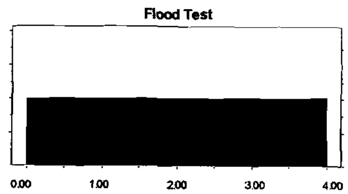
Years 2000-2006 Water Supply Risk Assessment Model Results

Assumptions

Assumption: Flood Test **Cell: C8**

Uniform distribution with parameters:

Minimum	0.00
Maximum	4.00

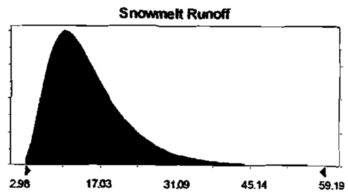


Mean value in simulation was 2.00

Assumption: Snowmelt Runoff **Cell: E8**

Lognormal distribution with parameters:

Mean	15.04
Standard Dev.	7.98

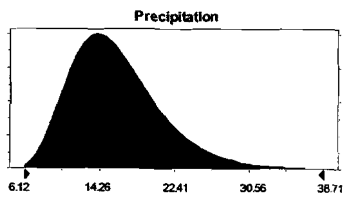


Selected range is from 0.00 to +Infinity
Mean value in simulation was 15.03

Assumption: Precipitation **Cell: F7**

Lognormal distribution with parameters:

Mean	16.13
Standard Dev.	5.08

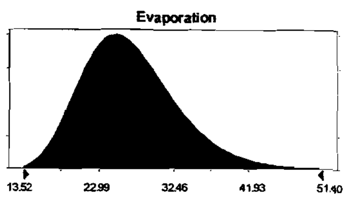


Selected range is from 0.00 to +Infinity
Mean value in simulation was 16.12

Assumption: Evaporation **Cell: G7**

Lognormal distribution with parameters:

Mean	27.02
Standard Dev.	6.09



Selected range is from 0.00 to +Infinity
Mean value in simulation was 27.01

End of Assumptions

Attachment D-2

Years 2007-2029 Water Supply Risk Assessment Model Results

Crystal Ball Report

Simulation started on 4/27/00 at 17:47:35

Simulation stopped on 4/27/00 at 20:02:03

Forecast: # Years with Supply 2007 - 2029 **Cell: J36**

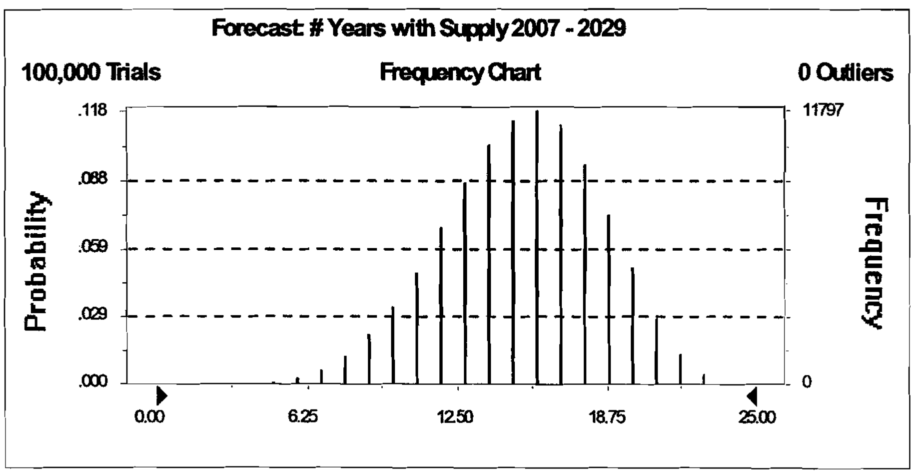
Summary:

Display Range is from 0.00 to 25.00

Entire Range is from 2.00 to 23.00

After 100,000 Trials, the Std. Error of the Mean is 0.01

Statistics:	Value
Trials	100000
Mean	15.32
Median	15.00
Mode	16.00
Standard Deviation	3.29
Variance	10.81
Skewness	-0.26
Kurtosis	2.81
Coeff. of Variability	0.21
Range Minimum	2.00
Range Maximum	23.00
Range Width	21.00
Mean Std. Error	0.01



Years 2007-2029 Water Supply Risk Assessment Model Results

Forecast: # Years with Supply 2007 - 2029 (cont'd) **Cell: J36**

Percentiles:

Percentile	Value
0%	2.00
10%	11.00
20%	13.00
30%	14.00
40%	15.00
50%	15.00
60%	16.00
70%	17.00
80%	18.00
90%	19.00
100%	23.00

Frequency Counts:

Frequency:

	Start Value	End Value	Prob.	Freq.
	0	0	0.00%	0
	1	1	0.00%	0
	2	2	0.00%	3
	3	3	0.02%	17
	4	4	0.05%	52
	5	5	0.14%	139
	6	6	0.32%	318
	7	7	0.66%	656
	8	8	1.26%	1264
	9	9	2.18%	2175
	10	10	3.37%	3367
	11	11	4.87%	4874
	12	12	6.83%	6828
	13	13	8.78%	8776
	14	14	10.38%	10384
	15	15	11.40%	11400
	16	16	11.80%	11797
	17	17	11.22%	11221
	18	18	9.49%	9490
	19	19	7.34%	7338
	20	20	5.14%	5144
	21	21	2.91%	2914
	22	22	1.37%	1372
	23	23	0.47%	471
Total:			100.00%	100000

Attachment D-2

Years 2007-2029 Water Supply Risk Assessment Model Results

Cumulative:

Start Value	End Value	Prob.	Freq.
0	0	0.00%	0
1	1	0.00%	0
2	2	0.00%	3
3	3	0.02%	20
4	4	0.07%	72
5	5	0.21%	211
6	6	0.53%	529
7	7	1.19%	1185
8	8	2.45%	2449
9	9	4.62%	4624
10	10	7.99%	7991
11	11	12.87%	12865
12	12	19.69%	19693
13	13	28.47%	28469
14	14	38.85%	38853
15	15	50.25%	50253
16	16	62.05%	62050
17	17	73.27%	73271
18	18	82.76%	82761
19	19	90.10%	90099
20	20	95.24%	95243
21	21	98.16%	98157
22	22	99.53%	99529
23	23	100.00%	100000

End of Forecast

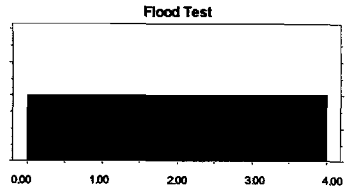
Years 2007-2029 Water Supply Risk Assessment Model Results

Assumptions

Assumption: Flood Test **Cell: C8**

Uniform distribution with parameters:

Minimum	0.00
Maximum	4.00

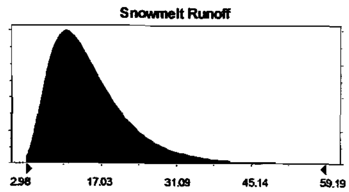


Mean value in simulation was 2.00

Assumption: Snowmelt Runoff **Cell: E8**

Lognormal distribution with parameters:

Mean	15.04
Standard Dev.	7.98

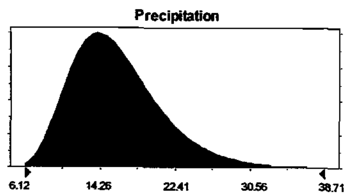


Selected range is from 0.00 to +Infinity
Mean value in simulation was 15.03

Assumption: Precipitation **Cell: F7**

Lognormal distribution with parameters:

Mean	16.13
Standard Dev.	5.08

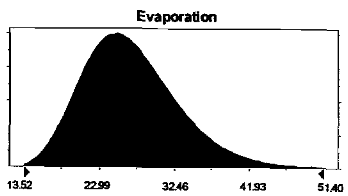


Selected range is from 0.00 to +Infinity
Mean value in simulation was 16.12

Assumption: Evaporation **Cell: G7**

Lognormal distribution with parameters:

Mean	27.02
Standard Dev.	6.09



Selected range is from 0.00 to +Infinity
Mean value in simulation was 27.01

End of Assumptions

APPENDIX E

SAKOONANG CHANNEL DISCHRAGE ESTIMATES BASED ON MEASURMENTS IN THE EAST CHANNEL

TABLE OF CONTENTS

LIST OF TABLES AND FIGURES

Methods

Mean Sakoonang Channel Hydrograph

A number of years of water surface elevation and discharge data are available for the East Channel at the head of the delta (E27.09). This data was used in combination with two equations describing the relationship between the magnitude of the discharge in the East Channel and the magnitude of the discharge in the Sakoonang Channel to prepare a mean spring and summer hydrograph for the Sakoonang Channel.

East Channel Data

Estimates of the discharge in the East Channel at the head of the delta, during most of the open water season, are available for 1962 (Arnborg et al, 1966), 1977 (U.S. Geological Survey, 1978) and 1999 (Appendix C). Additionally, both discontinuous and continuous water surface elevation measurements were made over most of the open water season in 1997 (Aldrich and Noll, 1997). This information was used in conjunction with a stage-discharge curve (Aldrich and Ray, 1996) to estimate the discharge at the head of the delta during 1997.

In addition to the above referenced data, there are a number of years for which estimates of the discharge during breakup are available. This data was collected in 1993 (Aldrich and Hammond, 1993), 1996 (Aldrich and Ray, 1996) and 1998 (Michael Baker Jr., Inc., 1998).

Relationship Between East Channel And Sakoonang Channel Discharges

Using the data collected in the Sakoonang and East Channels during 1999 (Appendix C), two linear regression equations were developed to describe the relationship between the magnitude of the discharge in the East Channel and the magnitude of the discharge in the Sakoonang Channel. The relationships are as follows.

From the beginning of breakup through the 3rd day after the peak discharge at the head of the delta, the time when ice is most likely to be affecting the relationship between the water surface elevation and discharge, the following relationship was developed.

$$Q_{ADDS} = 0.0156 * Q_{ADDE} - 307.51$$

Where:

Q_{ADDS} = Average daily discharge in the Sakoonang Channel in cfs, and

Q_{ADDE} = Average daily discharge in the East Channel in cfs.

The correlation coefficient associated with this equation (R^2) is 0.84 and the standard error of the estimate (SEE) is 230 cfs.

For the period starting with the 5th day after the peak discharge and continuing through the summer, the following relationship was developed.

$$Q_{ADDS} = 0.0145 * Q_{ADDE} - 448.57$$

Where:

Q_{ADDS} = Average daily discharge in the Sakoonang Channel in cfs, and

Q_{ADDE} = Average daily discharge in the East Channel in cfs.

The correlation coefficient associated with this equation (R^2) is 0.97 and the standard error of the estimate (SEE) is 54 cfs.

On the 4th day after the peak discharge at the head of the delta, the discharge in the Sakoonang Channel is assumed to be the average of the estimates produced with the two equations described above.

Using these equations and the historic discharge data available for the East Channel at the head of the delta, the discharge likely to have occurred in the Sakoonanag Channel during 1962, 1977, 1993, 1996, 1997, and 1998 was estimated.

Results

A summary of the average daily discharge estimated to have occurred in the East and Sakoonang Channels during 1962, 1977, 1993, 1996, 1997, 1998, and 1999 is presented in Table E-1. A plot of discharge estimated to have occurred in the Sakoonang Channel during each of the above referenced years is presented in Figure E-1. A plot of the likely mean discharge in the Sakoonang Channel is presented in Figure E-2.

Table E-1: East And Sakoonang Channel Discharge

Date	East Channel At River Mile 27.09 (flow in cfs) (1)							Sakoonang Channel At River Mile 15.79 (flow in cfs) (2)							Date
	1962	1977	1993	1996	1997	1998	1999 (3)	1962	1977	1993	1996	1997	1998	1999 (3)	
15-May															15-May
16-May															16-May
17-May															17-May
18-May															18-May
19-May				87,700							1,061				19-May
20-May				71,100							802				20-May
21-May				58,900							611				21-May
22-May				50,100							474				22-May
23-May				46,600							419				23-May
24-May				53,800							530				24-May
25-May	3,750			98,500				0			1,230				25-May
26-May	15,631			151,700			64,600	0			2,060			785	26-May
27-May	52,257			147,100		170,000	76,900	508			1,990		2,340	934	27-May
28-May	54,300		76,000	127,900	76,000	148,000	81,000	540		878	1,690	878	2,000	1,370	28-May
29-May	49,168		158,000	108,900	138,900	172,800	123,000	460		2,157	1,390	1,859	2,390	1,470	29-May
30-May	38,442		245,000	108,500	130,100	191,600	160,000	292		3,514	1,250	1,722	2,680	2,290	30-May
31-May	29,980		357,000	106,700	112,200	199,100	92,500	160		5,262	1,099	1,443	2,800	2,330	31-May
1-Jun	28,135		330,000	89,900	94,800	195,400	95,800	131		4,840	855	1,171	2,740	1,060	1-Jun
2-Jun	60,593		257,000	76,800	77,350	203,400	83,900	638		3,700	665	790	2,870	860	2-Jun
3-Jun	139,563		199,000	64,000	61,800	204,800	80,900	1,870		2,800	479	448	2,890	794	3-Jun
4-Jun	157,271			60,500	58,000	114,200	84,200	2,146			429	392	1,470	779	4-Jun
5-Jun	134,636			56,000	82,300		91,600	1,793			363	745		817	5-Jun
6-Jun	96,064			46,300	124,550		81,500	1,191			223	1,357		727	6-Jun
7-Jun	62,253				160,300		70,700	664				1,876		610	7-Jun
8-Jun	63,099				153,300		65,800	677				1,774		532	8-Jun
9-Jun	101,305	277,000			122,400		65,800	1,273	4,010			1,326		516	9-Jun
10-Jun	118,819	240,000			94,700		71,500	1,546	3,440			925		601	10-Jun
11-Jun	140,183	235,000			75,200		78,100	1,879	3,160			642		680	11-Jun
12-Jun	179,339	205,000			66,100		85,300	2,490	2,520			510		775	12-Jun
13-Jun	209,630	146,000			66,100		77,200	2,963	1,670			510		697	13-Jun

Table E-1 (Continued): East And Sakoonang Channel Discharge

14-Jun	214,701	117,000			62,300		70,400	3,042	1,250			455		610	14-Jun
15-Jun	210,381	92,800			62,800		68,200	2,974	897			462		586	15-Jun
16-Jun	188,622	94,500			62,500		62,800	2,635	922			458		544	16-Jun
17-Jun	134,344	88,600			61,900		54,200	1,788	836			449		376	17-Jun
18-Jun	102,085	68,700			60,450		47,300	1,285	548			428		229	18-Jun
19-Jun	78,464	62,500			58,950		45,000	857	458			406		164	19-Jun
20-Jun	60,477	72,400			57,600		54,100	428	601			387		301	20-Jun
21-Jun	54,918	98,500			53,700		59,500	348	980			330		500	21-Jun
22-Jun	54,796	76,900			47,100		46,600	346	666			234		269	22-Jun
23-Jun	63,924	63,000			41,600		36,400	478	465			155		54	23-Jun
24-Jun	77,784	52,100			37,700		31,000	679	307			98		0	24-Jun
25-Jun	73,423	49,000			34,300		27,300	616	262			49		0	25-Jun
26-Jun	52,959	49,100			30,800		23,800	319	263			0		0	26-Jun
27-Jun	36,399	50,600			28,300		23,200	79	285			0		0	27-Jun
28-Jun	34,554	48,000			25,800		21,300	52	247			0		0	28-Jun
29-Jun	31,693	46,000			22,200		21,300	11	218			0		0	29-Jun
30-Jun	26,561	44,000			21,600		19,900	0	189			0		0	30-Jun
1-Jul	22,021	40,000			20,000		17,300	0	131			0		0	1-Jul
2-Jul	19,224	38,000			20,600		15,500	0	102			0		0	2-Jul
3-Jul	20,701	36,000			18,000		14,300	0	73			0		0	3-Jul
4-Jul	49,916	34,000			16,700		13,600	275	44			0		0	4-Jul
5-Jul	41,731	32,000			24,400		12,000	157	15			0		0	5-Jul
6-Jul	28,717	30,000			29,100		14,700	0	0			0		0	6-Jul
7-Jul	24,891	28,000			27,700		14,500	0	0			0		0	7-Jul
8-Jul	24,867	28,000			25,600		14,700	0	0			0		0	8-Jul
9-Jul	27,035	27,000			25,800		13,100	0	0			0		0	9-Jul
10-Jul	27,906	26,000			28,400		15,900	0	0			0		0	10-Jul
11-Jul	27,406	26,000			26,400		14,700	0	0			0		0	11-Jul
12-Jul	28,042	25,000			26,700		12,200	0	0			0		0	12-Jul
13-Jul	31,423	24,000			33,200		8,900	7	0			33		0	13-Jul
14-Jul	33,550	23,000			37,000		5,600	38	0			88		0	14-Jul
15-Jul	35,067	22,000			37,600		2,700	60	0			97		0	15-Jul
16-Jul	36,183	22,000			37,700		11,400	76	0			98		0	16-Jul

Table E-1 (Continued): East And Sakoonang Channel Discharge

17-Jul	38,752	21,600			36,600		15,300	113	0			82		0	17-Jul
18-Jul	39,877	18,000			31,800		27,400	130	0			13		6	18-Jul
19-Jul	34,481	17,000			26,100		91,000	51	0			0		713	19-Jul
20-Jul	30,505	16,100			24,500		82,300	0	0			0		783	20-Jul
21-Jul	28,232	16,500			22,400		59,000	0	0			0		543	21-Jul
22-Jul	23,857	16,400			19,300		44,900	0	0			0		298	22-Jul
23-Jul	20,204	14,400			17,800		45,000	0	0			0		218	23-Jul
24-Jul	27,747	14,200			21,400		45,300	0	0			0		202	24-Jul
25-Jul	38,293	13,000			28,100		43,500	107	0			0		204	25-Jul
26-Jul	37,155	12,000			29,300		40,200	90	0			0		173	26-Jul
27-Jul	35,762	11,000			29,700		32,700	70	0			0		19	27-Jul
28-Jul	43,183	10,000			27,900		25,100	178	0			0		0	28-Jul
29-Jul	45,826	9,800			35,200		20,900	216	0			62		0	29-Jul
30-Jul	40,451	9,800			39,900		17,100	138	0			130		0	30-Jul
31-Jul	36,726	9,800			36,900		16,600	84	0			86		0	31-Jul
1-Aug	41,445	9,800			29,100		16,200	152	0			0		0	1-Aug
2-Aug	52,680	9,800			25,000		18,700	315	0			0		0	2-Aug
3-Aug	58,293	9,800			19,800		12,500	397	0			0		0	3-Aug
4-Aug	54,302	10,000			20,500		9,900	339	0			0		0	4-Aug
5-Aug	47,846	12,000			23,700		16,600	245	0			0		0	5-Aug
6-Aug	48,448	13,000			18,200		18,600	254	0			0		0	6-Aug
7-Aug	55,233	16,800			15,600		16,800	352	0			0		0	7-Aug
8-Aug	64,652	18,500			31,200		10,500	489	0			4		0	8-Aug
9-Aug	73,022	18,200			55,200		5,700	610	0			352		0	9-Aug
10-Aug	70,880	27,000			52,500		19,300	579	0			313		0	10-Aug
11-Aug	59,139	26,400			46,300		32,600	409	0			223		0	11-Aug
12-Aug	48,071	22,100			42,500		38,600	248	0			168		38	12-Aug
13-Aug	39,498	20,300			36,800		38,200	124	0			85		27	13-Aug
14-Aug	35,103	25,000			35,200		36,000	60	0			62		4	14-Aug
15-Aug	30,485	27,500			43,400		36,600	0	0			181		14	15-Aug
16-Aug	26,047	24,800			58,800		35,100	0	0			404		0	16-Aug
17-Aug	23,033	24,200			65,300		34,100	0	0			498		10	17-Aug
18-Aug	22,771	32,600			58,700		35,200	0	24			403		25	18-Aug

Table E-1 (Continued): East And Sakoonang Channel Discharge

19-Aug	26,542	33,800			55,200		33,600	0	42			352		23	19-Aug
20-Aug	34,469	33,000			61,600		28,600	51	30			445		2	20-Aug
21-Aug	41,843	31,500			57,800		27,200	158	8			390		0	21-Aug
22-Aug	42,920	30,700			54,400		21,300	174	0			340		0	22-Aug
23-Aug	39,845	39,400			48,600		24,800	129	123			256		0	23-Aug
24-Aug	39,456	27,200			45,000		28,000	124	0			204		0	24-Aug
25-Aug	47,885	25,700			44,600		25,300	246	0			198		0	25-Aug
26-Aug	56,521	24,500			42,000		21,000	371	0			160		0	26-Aug
27-Aug	56,162	22,900			37,700		22,100	366	0			98		0	27-Aug
28-Aug	55,008	22,100			42,200		18,000	349	0			163		0	28-Aug
29-Aug	50,762	23,300			46,300		17,400	287	0			223		0	29-Aug
30-Aug	41,541	22,600			46,700		16,500	154	0			229		0	30-Aug
31-Aug	40,074	23,000			47,600		12,900	132	0			242		0	31-Aug
1-Sep	44,990	19,000			52,500		14,300	204	0			313		0	1-Sep
2-Sep	51,789	18,100			56,100		10,200	302	0			365		0	2-Sep
3-Sep	59,641	19,500			65,500		17,000	416	0			501		0	3-Sep
4-Sep	67,099	20,000			75,400		18,800	524	0			645		0	4-Sep
5-Sep	71,386	20,900			75,400		15,400	587	0			645		0	5-Sep
6-Sep	72,168	20,000			86,900		23,300	598	0			811		0	6-Sep
7-Sep	67,354	19,400			90,900		26,600	528	0			869		0	7-Sep
8-Sep	57,076	16,700			73,100		25,000	379	0			611		0	8-Sep
9-Sep	52,836	16,400			57,400		21,200	318	0			384		0	9-Sep
10-Sep	51,563	21,500			48,900		20,300	299	0			260		0	10-Sep
11-Sep	45,441	20,000			42,700		19,900	210	0			171		0	11-Sep
12-Sep	38,431	20,000					22,100	109	0					0	12-Sep
13-Sep	36,344	18,000					21,400	78	0					0	13-Sep
14-Sep	35,085	16,000					19,400	60	0					0	14-Sep
15-Sep	32,156	15,000					16,600	18	0					0	15-Sep
16-Sep	27,891	14,000					22,500	0	0					0	16-Sep
17-Sep	22,511	13,000					28,200	0	0					0	17-Sep
18-Sep	18,644	12,000					28,200	0	0					2	18-Sep
19-Sep	16,143	12,000					22,700	0	0					0	19-Sep
20-Sep	13,946	12,000					21,000	0	0					0	20-Sep

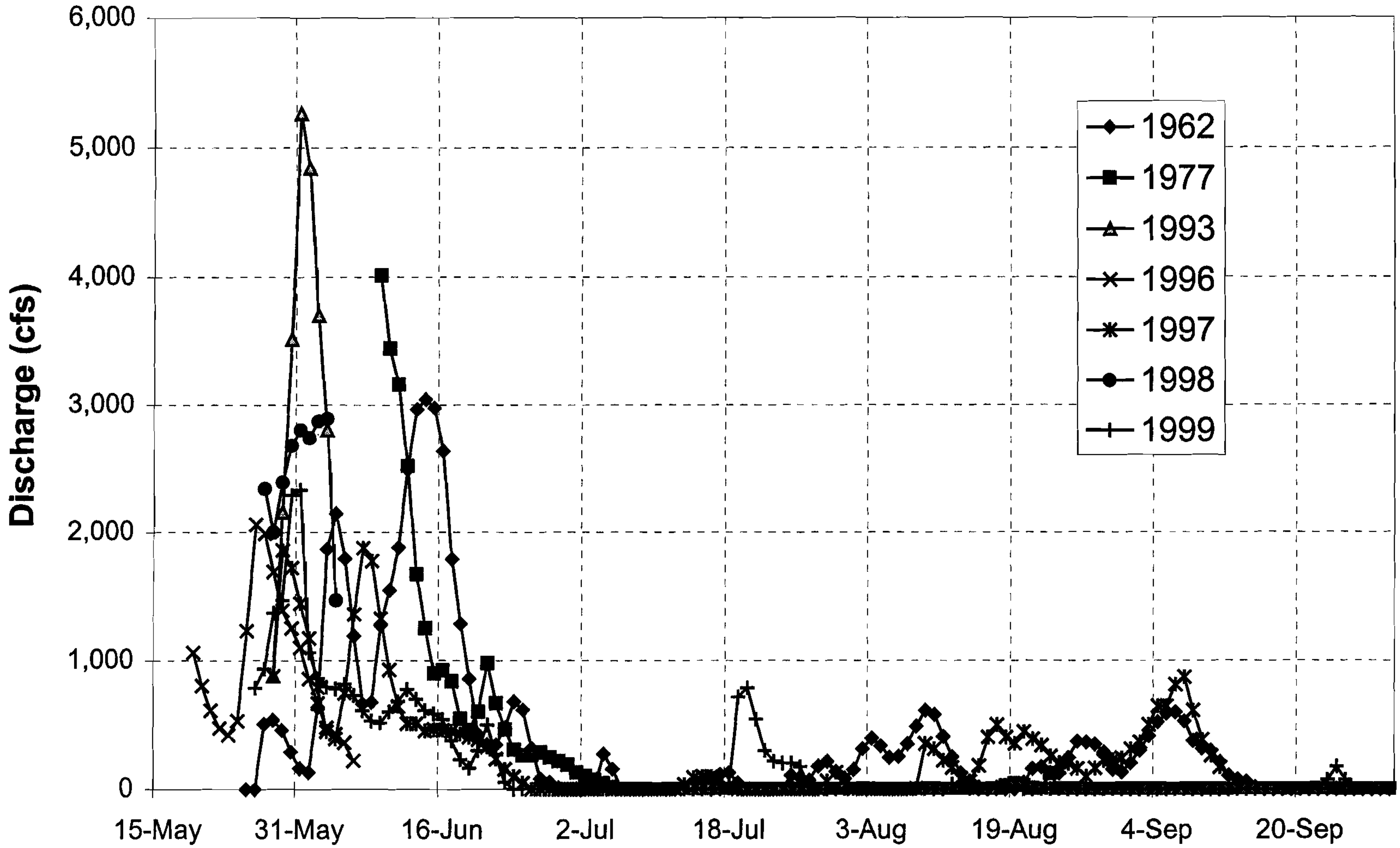
Table E-1 (Continued): East And Sakoonang Channel Discharge

21-Sep	12,147	11,000					26,700	0	0					0	21-Sep
22-Sep	10,842	10,000					29,800	0	0					0	22-Sep
23-Sep	9,540	10,000					38,200	0	0					72	23-Sep
24-Sep	8,410	9,800					48,400	0	0					174	24-Sep
25-Sep	7,412	9,800					39,000	0	0					72	25-Sep
26-Sep	6,401	9,800						0	0						26-Sep
27-Sep	5,664	9,800						0	0						27-Sep
28-Sep	5,368	9,800						0	0						28-Sep
29-Sep	5,088	9,800						0	0						29-Sep
30-Sep	4,724	9,800						0	0						30-Sep

Notes:

1. The 1962 East Channel discharge was taken from Arnborg (1966).
   The 1977 East Channel discharge was taken from U.S. Geological Survey (1977).
   The 1993 East Channel discharge was taken from Aldrich and Hammond (1993).
   The 1996 East Channel discharge was taken from Aldrich and Ray (1996).
   The 1997 East Channel discharge was computed from water surface elevations provided in Aldrich and Noll (1997) and the open water stage-discharge curve presented in Aldrich and Ray (1996).
   The 1998 East Channel discharge was taken from Michael Baker Jr., Inc. (1998).
   The 1999 East Channel discharge was computed based on water surface elevations measured in 1999. During the open water season, the discharge was computed using the stage-discharge curve presented in Aldrich and Ray (1996). During the period when ice impacted the water surface elevation, the discharge was computed based on normal depth computations using water surface slopes measured at the same time as the water surface elevation.
2. The discharge in the Sakoonang Channel was estimated based on the discharge in the East Channel except for 1999 when it was estimated based on water surface elevation and discharge measurements made in the Sakoonang Channel (Appendices C and E).

Figure E-1: Sakoonang Channel 1962, 1977, 1993, 1996, 1997, 1998, & 1999 Hydrographs



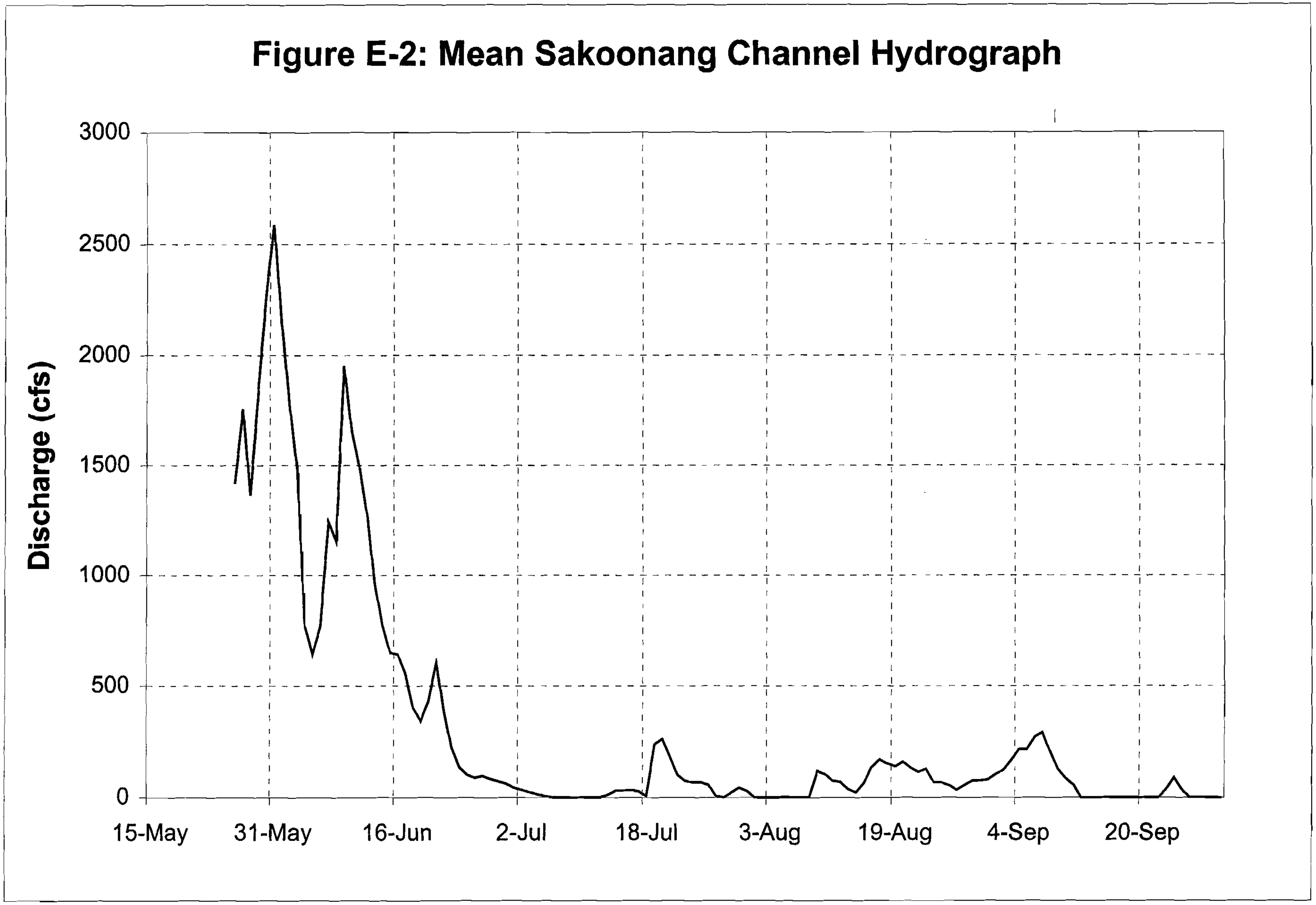


Figure E-2: Mean Sakoonang Channel Hydrograph
Discharge (cfs)
3000
2500
2000
1500
1000
500
0
15-May
31-May
16-Jun
2-Jul
18-Jul
3-Aug
19-Aug
4-Sep
20-Sep

APPENDIX F

NORTHERN TESTING LABORATORIES
WATER QUALITY DATA REPORTS

TABLE OF CONTENTS

1999 Sakoonang Channel Data

NORTHERN TESTING LABORATORIES, INC.

3330 INDUSTRIAL AVENUE FAIRBANKS, ALASKA 99701 (907) 456-3116 • FAX 456-3125
8005 SCHOON STREET ANCHORAGE, ALASKA 99518 (907) 349-1000 • FAX 349-1016
POUCH 340043 PRUDHOE BAY, ALASKA 99734 (907) 659-2145 • FAX 659-2146

Michael Baker, Jr. Inc.
100 Cushman Street, Ste. 201
Fairbanks AK 99701

Attn: J. Aldrich/J. Abrams

Report Date: 06/22/99

Date Arrived: 06/02/99
Date Sampled: 06/01/99
Time Sampled: 1130
Collected By: JA

MRL = Method Reporting Limit

* Flag Definitions
B = Below Regulatory Min.
H = Above Regulatory Max.

Our Lab #: F184671
Location/Project: Alpine 1999 Water Program
Your Sample ID: Sakoonang TBM 8U
Sample Matrix: Water
Comments: Sakoonang Channel

Lab#	Method	Parameter	Units	Results	*	MRL	Digest Prepared	Date Analyzed
F184671	EPA 200.7	Aluminum, Total Recoverable	mg/L	3.11	H	0.50		06/17/99
		Barium, Total Recoverable	mg/L	0.0988		0.0040	06/08/99	06/17/99
		Beryllium, Total Recoverable	mg/L	<MRL		0.0010	06/08/99	06/17/99
		Calcium, Total Recoverable	mg/L	7.92		0.35	06/08/99	06/17/99
		Copper, Total Recoverable	mg/L	0.008		0.004	06/08/99	06/17/99
		Iron, Total Recoverable	mg/L	5.08	H	2.000	06/08/99	06/17/99
		Manganese, Total Recoverable	mg/L	0.121	H	0.005	06/08/99	06/17/99
		Sodium, Total Recoverable	mg/L	2.9		0.1	06/08/99	06/21/99
		Nickel, Total Recoverable	mg/L	<MRL		0.02	06/08/99	06/17/99
		Zinc, Total Recoverable	mg/L	<MRL		0.02	06/08/99	06/17/99
	EPA 200.9	Silver, Total Recoverable	mg/L	0.0001		0.0001	06/08/99	06/15/99
		Arsenic, Total Recoverable	mg/L	0.003		0.002	06/08/99	06/11/99
		Cadmium, Total Recoverable	mg/L	0.0001		0.0001	06/08/99	06/15/99
		Chromium, Total Recoverable	mg/L	0.003		0.001	06/08/99	06/15/99
		Antimony, Total	mg/L	<MRL		0.002	06/08/99	06/18/99

Cindy L. Christian

Reported By: Cindy L. Christian
Laboratory Director

NORTHERN TESTING LABORATORIES, INC.

3330 INDUSTRIAL AVENUE FAIRBANKS, ALASKA 99701 (907) 456-3116 • FAX 456-3125
8005 SCHOON STREET ANCHORAGE, ALASKA 99518 (907) 349-1000 • FAX 349-1016
POUCH 340043 PRUDHOE BAY, ALASKA 99734 (907) 659-2145 • FAX 659-2146

Lab#	Method	Parameter	Units	Results *	MRL	Digest Prepared	Date Analyzed
		Recoverable					
F184671	EPA 200.9	Selenium, Total Recoverable	mg/L	<MRL	0.002	06/08/99	06/11/99
		Thallium, Total Recoverable	mg/L	<MRL	0.001	06/08/99	06/18/99
	EPA 245.1	Mercury	mg/L	<MRL	0.0002		06/07/99
	EPA 300.0	Chloride	mg/L	2.61	0.08		06/02/99
		Fluoride	mg/L	<MRL	0.06		06/02/99
		Nitrate-N	mg/L	0.06	0.03		06/02/99
		Sulfate	mg/L	5.5	0.2		06/02/99
	SM2120-B	Color, Apparent	Unit	200 H	50		06/02/99
	SM2150-B	Odor	TON	2	1		06/02/99
	SM2320-B	Alkalinity as CaCO3	mg/L	21	15		06/04/99
	SM2330-B	Langelier Index	Unit	-2.0 B			06/21/99
	SM2540-C	Total Dissolved Solids	mg/L	54	35		06/03/99
	SM4500-CN -E	Total Cyanide	mg/L	<MRL	0.02		06/11/99
	SM4500-H- B	pH	Unit	7.3			06/02/99

Reported By: Cindy L. Christian
Laboratory Director

NORTHERN TESTING LABORATORIES, INC.

3330 INDUSTRIAL AVENUE
8005 SCHOON STREET
POUCH 340043

FAIRBANKS, ALASKA 99701
ANCHORAGE, ALASKA 99518
PRUDHOE BAY, ALASKA 99734

(907) 456-3116 • FAX 456-3125
(907) 349-1000 • FAX 349-1016
(907) 659-2145 • FAX 659-2146

Michael Baker Jr., Inc.
1000 Cushman Street, Suite 201
Fairbanks, AK 99701

Attn: James W. Aldrich

Client ID: Sakoonang TBM8U
Client Project #:
Source: Sakoonang Channel
NTL Lab#: A161130
Sample Matrix: Water
Comments: Alpine 1999 Water Program

Report Date: 6/9/99
Date Arrived: 6/3/99
Sample Date: 6/1/99
Sample Time: 11:19
Collected By: Julene Abrams

** Legend **

MRL = Method Report Level
MCL = Max. Contaminant Level
B = Present In Method Blank
E = Estimated Value
M = Matrix Interference
H = Above MCL
D = Lost To Dilution

Method	Parameter	Units	Result	MRL	Date Prepared	Date Analyzed
EPA 524.2						
	Benzene	ug/L	<MRL	0.20		6/4/99
	Bromobenzene	ug/L	<MRL	0.20		
	Bromochloromethane	ug/L	<MRL	0.20		
	Bromodichloromethane	ug/L	<MRL	0.20		
	Bromoform	ug/L	<MRL	0.50		
	Bromomethane	ug/L	<MRL	1.00		
	n-Butylbenzene	ug/L	<MRL	0.20		
	sec-Butylbenzene	ug/L	<MRL	0.20		
	tert-Butylbenzene	ug/L	<MRL	0.20		
	Carbon Tetrachloride	ug/L	<MRL	0.20		
	Chlorobenzene	ug/L	<MRL	0.20		
	Chloroethane	ug/L	<MRL	1.00		
	Chloroform	ug/L	<MRL	0.30		
	Chloromethane	ug/L	<MRL	0.50		
	2-Chlorotoluene	ug/L	<MRL	0.20		
	4-Chlorotoluene	ug/L	<MRL	0.20		
	Dibromochloromethane	ug/L	<MRL	0.20		
	Dibromomethane	ug/L	<MRL	0.20		
	1,2-Dichlorobenzene	ug/L	<MRL	0.20		
	1,3-Dichlorobenzene	ug/L	<MRL	0.20		
	1,4-Dichlorobenzene	ug/L	<MRL	0.20		
	Dichlorodifluoromethane	ug/L	<MRL	0.50		
	1,1-Dichloroethane	ug/L	<MRL	0.20		

Stephanie K. Cowling

Reported By: Stephanie K. Cowling
Chemistry Supervisor

NORTHERN TESTING LABORATORIES, INC.

3330 INDUSTRIAL AVENUE FAIRBANKS, ALASKA 99701 (907) 456-3116 • FAX 456-3125
8005 SCHOON STREET ANCHORAGE, ALASKA 99518 (907) 349-1000 • FAX 349-1016
POUCH 340043 PRUDHOE BAY, ALASKA 99734 (907) 659-2145 • FAX 659-2146

Michael Baker Jr., Inc.
1000 Cushman Street, Suite 201
Fairbanks, AK 99701

Attn: James W. Aldrich

Client ID: Sakoonang TBM8U
Client Project #:
Source: Sakoonang Channel
NTL Lab#: A161130
Sample Matrix: Water
Comments: Alpine 1999 Water Program

Report Date: 6/9/99
Date Arrived: 6/3/99
Sample Date: 6/1/99
Sample Time: 11:19
Collected By: Julene Abrams

** Legend **
MRL = Method Report Level
MCL = Max. Contaminant Level
B = Present In Method Blank
E = Estimated Value
M = Matrix Interference
H = Above MCL
D = Lost To Dilution

Method	Parameter	Units	Result	MRL	Date Prepared	Date Analyzed
	1,2-Dichloroethane	ug/L	<MRL	0.20		6/4/99
	1,1-Dichloroethene	ug/L	<MRL	0.20		
	cis-1,2-Dichloroethene	ug/L	<MRL	0.20		
	trans-1,2-Dichloroethene	ug/L	<MRL	0.20		
	1,2-Dichloropropane	ug/L	<MRL	0.20		
	1,3-Dichloropropane	ug/L	<MRL	0.20		
	2,2-Dichloropropane	ug/L	<MRL	0.20		
	1,1-Dichloropropene	ug/L	<MRL	0.20		
	cis-1,3-Dichloropropene	ug/L	<MRL	0.20		
	trans-1,3-Dichloropropene	ug/L	<MRL	0.20		
	Ethylbenzene	ug/L	<MRL	0.20		
	Hexachlorobutadiene	ug/L	<MRL	0.20		
	Isopropylbenzene	ug/L	<MRL	0.20		
	p-Isopropyltoluene	ug/L	<MRL	0.20		
	Methylene Chloride	ug/L	<MRL	0.50		
	Naphthalene	ug/L	<MRL	0.20		
	n-Propylbenzene	ug/L	<MRL	0.20		
	Styrene	ug/L	<MRL	0.20		
	1,1,1,2-Tetrachloroethane	ug/L	<MRL	0.20		
	1,1,2,2-Tetrachloroethane	ug/L	<MRL	0.20		
	Tetrachloroethene	ug/L	<MRL	0.20		
	Toluene	ug/L	<MRL	0.20		
	1,2,3-Trichlorobenzene	ug/L	<MRL	0.20		
	1,2,4-Trichlorobenzene	ug/L	<MRL	0.20		

Stephanie K. Cowling

Reported By: Stephanie K. Cowling
Chemistry Supervisor

NORTHERN TESTING LABORATORIES, INC.

3330 INDUSTRIAL AVENUE FAIRBANKS, ALASKA 99701 (907) 456-3116 • FAX 456-3125
8005 SCHOON STREET ANCHORAGE, ALASKA 99518 (907) 349-1000 • FAX 349-1016
POUCH 340043 PRUDHOE BAY, ALASKA 99734 (907) 659-2145 • FAX 659-2146

Michael Baker Jr., Inc.
1000 Cushman Street, Suite 201
Fairbanks, AK 99701

Attn: James W. Aldrich

Client ID: Sakoonang TBM8U
Client Project #:
Source: Sakoonang Channel
NTL Lab#: A161130
Sample Matrix: Water
Comments: Alpine 1999 Water Program

Report Date: 6/9/99
Date Arrived: 6/3/99
Sample Date: 6/1/99
Sample Time: 11:19
Collected By: Julene Abrams

** Legend **
MRL = Method Report Level
MCL = Max. Contaminant Level
B = Present In Method Blank
E = Estimated Value
M = Matrix Interference
H = Above MCL
D = Lost To Dilution

Method	Parameter	Units	Result	MRL	Date Prepared	Date Analyzed
	1,1,1-Trichloroethane	ug/L	<MRL	0.20		6/4/99
	1,1,2-Trichloroethane	ug/L	<MRL	0.20		
	Trichloroethene	ug/L	<MRL	0.20		
	Trichlorofluoromethane	ug/L	<MRL	0.50		
	1,2,3-Trichloropropane	ug/L	<MRL	0.20		
	1,2,4-Trimethylbenzene	ug/L	<MRL	0.20		
	1,3,5-Trimethylbenzene	ug/L	<MRL	0.20		
	Vinyl Chloride	ug/L	<MRL	0.50		
	m,p-Xylene	ug/L	<MRL	0.20		
	o-Xylene	ug/L	<MRL	0.20		
	Total Trihalomethanes	ug/L	<MRL	0.50		
	4-Bromofluorobenzene	% Recovery	93			
	1,2-Dichlorobenzene-d4	% Recovery	88			
SM 5540 C						
	Foaming Agents (MBAS)	mg/L	<MRL	0.10		6/3/99

Stephanie K. Cowling

Reported By: Stephanie K. Cowling
Chemistry Supervisor

NORTHERN TESTING LABORATORIES, INC.

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POUCH 340043 PRUDHOE BAY, ALASKA 99734 (907) 659-2145 • FAX 659-2146

Michael Baker Jr., Inc.
1000 Cushman Street, Suite 201
Fairbanks, AK 99701

Attn: James W. Aldrich

Client ID: Travel Blank
Client Project #:
Source: Sakoonang Channel
NTL Lab#: A161131
Sample Matrix: Water
Comments: Alpine 1999 Water Program

Report Date: 6/9/99
Date Arrived: 6/3/99
Sample Date: 5/17/99
Sample Time:
Collected By:

** Legend **
MRL = Method Report Level
MCL = Max. Contaminant Level
B = Present In Method Blank
E = Estimated Value
M = Matrix Interference
H = Above MCL
D = Lost To Dilution

Method	Parameter	Units	Result	MRL	Date Prepared	Date Analyzed
EPA 524.2						
	Benzene	ug/L	<MRL	0.20		6/4/99
	Bromobenzene	ug/L	<MRL	0.20		
	Bromochloromethane	ug/L	<MRL	0.20		
	Bromodichloromethane	ug/L	<MRL	0.20		
	Bromoform	ug/L	<MRL	0.50		
	Bromomethane	ug/L	<MRL	1.00		
	n-Butylbenzene	ug/L	<MRL	0.20		
	sec-Butylbenzene	ug/L	<MRL	0.20		
	tert-Butylbenzene	ug/L	<MRL	0.20		
	Carbon Tetrachloride	ug/L	<MRL	0.20		
	Chlorobenzene	ug/L	<MRL	0.20		
	Chloroethane	ug/L	<MRL	1.00		
	Chloroform	ug/L	<MRL	0.30		
	Chloromethane	ug/L	<MRL	0.50		
	2-Chlorotoluene	ug/L	<MRL	0.20		
	4-Chlorotoluene	ug/L	<MRL	0.20		
	Dibromochloromethane	ug/L	<MRL	0.20		
	Dibromomethane	ug/L	<MRL	0.20		
	1,2-Dichlorobenzene	ug/L	<MRL	0.20		
	1,3-Dichlorobenzene	ug/L	<MRL	0.20		
	1,4-Dichlorobenzene	ug/L	<MRL	0.20		
	Dichlorodifluoromethane	ug/L	<MRL	0.50		
	1,1-Dichloroethane	ug/L	<MRL	0.20		

Stephanie K. Cowling

Reported By: Stephanie K. Cowling
Chemistry Supervisor

NORTHERN TESTING LABORATORIES, INC.

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Michael Baker Jr., Inc.
1000 Cushman Street, Suite 201
Fairbanks, AK 99701

Attn: James W. Aldrich

Client ID: Travel Blank
Client Project #:
Source: Sakoonang Channel
NTL Lab#: A161131
Sample Matrix: Water
Comments: Alpine 1999 Water Program

Report Date: 6/9/99
Date Arrived: 6/3/99
Sample Date: 5/17/99
Sample Time:
Collected By:

** Legend **

MRL = Method Report Level
MCL = Max. Contaminant Level
B = Present In Method Blank
E = Estimated Value
M = Matrix Interference
H = Above MCL
D = Lost To Dilution

Method	Parameter	Units	Result	MRL	Date Prepared	Date Analyzed
	1,2-Dichloroethane	ug/L	<MRL	0.20		6/4/99
	1,1-Dichloroethene	ug/L	<MRL	0.20		
	cis-1,2-Dichloroethene	ug/L	<MRL	0.20		
	trans-1,2-Dichloroethene	ug/L	<MRL	0.20		
	1,2-Dichloropropane	ug/L	<MRL	0.20		
	1,3-Dichloropropane	ug/L	<MRL	0.20		
	2,2-Dichloropropane	ug/L	<MRL	0.20		
	1,1-Dichloropropene	ug/L	<MRL	0.20		
	cis-1,3-Dichloropropene	ug/L	<MRL	0.20		
	trans-1,3-Dichloropropene	ug/L	<MRL	0.20		
	Ethylbenzene	ug/L	<MRL	0.20		
	Hexachlorobutadiene	ug/L	<MRL	0.20		
	Isopropylbenzene	ug/L	<MRL	0.20		
	p-Isopropyltoluene	ug/L	<MRL	0.20		
	Methylene Chloride	ug/L	<MRL	0.50		
	Naphthalene	ug/L	<MRL	0.20		
	n-Propylbenzene	ug/L	<MRL	0.20		
	Styrene	ug/L	<MRL	0.20		
	1,1,1,2-Tetrachloroethane	ug/L	<MRL	0.20		
	1,1,2,2-Tetrachloroethane	ug/L	<MRL	0.20		
	Tetrachloroethene	ug/L	<MRL	0.20		
	Toluene	ug/L	<MRL	0.20		
	1,2,3-Trichlorobenzene	ug/L	<MRL	0.20		
	1,2,4-Trichlorobenzene	ug/L	<MRL	0.20		

Stephanie K. Cowling

Reported By: Stephanie K. Cowling
Chemistry Supervisor

NORTHERN TESTING LABORATORIES, INC.

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Michael Baker Jr., Inc.
1000 Cushman Street, Suite 201
Fairbanks, AK 99701

Attn: James W. Aldrich

Client ID: Travel Blank
Client Project #:
Source: Sakoonang Channel
NTL Lab#: A161131
Sample Matrix: Water
Comments: Alpine 1999 Water Program

Report Date: 6/9/99
Date Arrived: 6/3/99
Sample Date: 5/17/99
Sample Time:
Collected By:

** Legend **
MRL = Method Report Level
MCL = Max. Contaminant Level
B = Present In Method Blank
E = Estimated Value
M = Matrix Interference
H = Above MCL
D = Lost To Dilution

Method	Parameter	Units	Result	MRL	Date Prepared	Date Analyzed
	1,1,1-Trichloroethane	ug/L	<MRL	0.20		6/4/99
	1,1,2-Trichloroethane	ug/L	<MRL	0.20		
	Trichloroethene	ug/L	<MRL	0.20		
	Trichlorofluoromethane	ug/L	<MRL	0.50		
	1,2,3-Trichloropropane	ug/L	<MRL	0.20		
	1,2,4-Trimethylbenzene	ug/L	<MRL	0.20		
	1,3,5-Trimethylbenzene	ug/L	<MRL	0.20		
	Vinyl Chloride	ug/L	<MRL	0.50		
	m,p-Xylene	ug/L	<MRL	0.20		
	o-Xylene	ug/L	<MRL	0.20		
	Total Trihalomethanes	ug/L	<MRL	0.50		
	4-Bromofluorobenzene	% Recovery	98			
	1,2-Dichlorobenzene-d4	% Recovery	90			

Stephanie K. Cowling

Reported By: Stephanie K. Cowling
Chemistry Supervisor

NORTHERN TESTING LABORATORIES, INC.

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POUCH 340043	PRUDHOE BAY, ALASKA 99734	(907) 659-2145 • FAX 659-2146

DRINKING WATER ANALYSIS REPORT FOR TOTAL COLIFORM BACTERIA

Michael Baker Jr. Inc.
100 Cushman Street, Ste. 201

Fairbanks AK 99701

Date Received: 6/2/99 Time Received: 10:15
Date Analyzed: 6/2/99 Time Analyzed: 13:40
Date Reported: 6/3/99 Time Reported: 15:00
Next Sample Due: ,

Phone Number:

Fax Number:

Collected by: JDA

Sample Type Routine

Method of Analysis: MMO-MUG (SM 9223 B)

Comments:

Comments
- S = Satisfactory
- U = Unsatisfactory
- POS = Positive Test Result
- ND = None Detected
- TNTC = Too Numerous To Count (>200 Colonies)
- CG = Confluent Growth
- HSM = Heavy Sediment Masking, Results May Not Be Reliable
- SA = Sample Age >30 Hours But <48 Hours, Results May Not Be Reliable
- Old = Sample Age >48 Hours, Too Old For Analysis
- R = Resample Required
- NT = No Test

* # Colonies/100 ml ** # Colonies/ml

Sample Date	Sample Time	Total* Coliform	E. Coli	Other* Bacteria	HPC** Result	Lab#	Location	Comments
6/1/99	11:29	POS	POS	NT	NT	AK5108	Sakoonang Channel TBM 8V	U, Resample

Cindy L. Christian Laboratory Director 6/3/99
Northern Testing Laboratories, Inc Fairbanks, AK

NORTHERN TESTING LABORATORIES, INC.

3330 INDUSTRIAL AVENUE | FAIRBANKS, ALASKA 99701 | (907) 456-3116 • FAX 456-3125
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POUCH 340043 | PRUDHOE BAY, ALASKA 99734 | (907) 659-2145 • FAX 659-2146

Michael Baker, Jr. Inc.
100 Cushman Street, Ste. 201
Fairbanks AK 99701

Attn: J. Aldrich/J. Abrams

Report Date: 11/24/99

Date Arrived: 06/02/99
Date Sampled: 06/01/99
Time Sampled: 1113
Collected By: JA

MRL = Method Reporting Limit

* Flag Definitions
B = Below Regulatory Min.
H = Above Regulatory Max.

Our Lab #: F184673
Location/Project: Alpine 1999 Water Program
Your Sample ID: Sakoonang TBM 8U
Sample Matrix: Water
Comments: Sakoonang Channel

Lab#	Method	Parameter	Units	Results *	MRL	Digest Prepared	Date Analyzed
F184673	EPA 900.0	Gross Alpha	pCi/L	1.89+/-0.71			11/05/99

Reported By: Cindy L. Christian
Laboratory Director

NORTHERN TESTING LABORATORIES, INC.

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POUCH 340043 — PRUDHOE BAY, ALASKA 99734 — (907) 659-2145 • FAX 659-2146

Michael Baker, Jr. Inc.
100 Cushman Street, Ste. 201
Fairbanks AK 99701

Attn: J. Aldrich/J. Abrams

Report Date: 06/09/99

Date Arrived: 06/02/99
Date Sampled: 05/31/99
Time Sampled: -
Collected By: JM

MRL = Method Reporting Limit

* Flag Definitions
B = Below Regulatory Min.
H = Above Regulatory Max.

Our Lab #: F184672
Location/Project: Alpine 1999 Water Program
Your Sample ID: Sakoonang TBM 8U
Sample Matrix: Water
Comments: Sakoonang Channel; Meas. liq. vol.= 128mL analyzed, 948mL submitted

Lab#	Method	Parameter	Units	Results *	MRL	Digest Prepared	Date Analyzed
F184672	SM2540-D	Total Suspended Solids	mg/L	160	7.8		06/04/99

Reported By: Cindy L. Christian
Laboratory Director

NORTHERN TESTING LABORATORIES, INC.

3330 INDUSTRIAL AVENUE, FAIRBANKS, ALASKA 99701, (907) 456-3116 • FAX 456-3125
8005 SCHOON STREET, ANCHORAGE, ALASKA 99518, (907) 349-1000 • FAX 349-1016
POUCH 340043, PRUDHOE BAY, ALASKA 99734, (907) 659-2145 • FAX 659-2146

Michael Baker Jr. Inc.
100 Cushman Street Suite 201
Fairbanks AK 99701

Attn: Jim Aldrich

Report Date: 06/15/99

Date Arrived: 06/10/99
Date Sampled: 06/06/99
Time Sampled: 1836
Collected By: JM

MRL = Method Reporting Limit

Our Lab #: F184842
Location/Project: Sakoonang Channel
Your Sample ID: 0-6′ Mix
Sample Matrix: Water
Comments:

* Flag Definitions
B = Below Regulatory Min.
H = Above Regulatory Max.

Lab#	Method	Parameter	Units	Results	*	MRL	Digest Prepared	Date Analyzed
F184842	SM2540-D	Total Suspended Solids	mg/L	92		5.4		06/11/99

Reported By: Cindy L. Christian
Laboratory Director

NORTHERN TESTING LABORATORIES, INC.

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POUCH 340043 — PRUDHOE BAY, ALASKA 99734 — (907) 659-2145 • FAX 659-2146

Michael Baker Jr. Inc.
100 Cushman Street Suite 201
Fairbanks AK 99701

Attn: Jim Aldrich

Report Date: 06/15/99

Date Arrived: 06/10/99
Date Sampled: 06/06/99
Time Sampled: 1840
Collected By: JM

MRL = Method Reporting Limit

* Flag Definitions
B = Below Regulatory Min.
H = Above Regulatory Max.

Our Lab #: F184843
Location/Project: Sakoonang Channel
Your Sample ID: 0-16.8' Mix
Sample Matrix: Water
Comments:

Lab#	Method	Parameter	Units	Results *	MRL	Digest Prepared	Date Analyzed
F184843	SM2540-D	Total Suspended Solids	mg/L	87	4.7		06/11/99

Reported By: Cindy L. Christian
Laboratory Director

NORTHERN TESTING LABORATORIES, INC.

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POUCH 340043 PRUDHOE BAY, ALASKA 99734 (907) 659-2145 • FAX 659-2146

Report Date: 10 June 99 Report No.: 99060009

Report of Analysis

Jim Aldrich
Michael Baker Jr., Inc.
100 Cushman St. STE 201
Fairbanks, AK 99701
Phone # 455-8073

Field ID Number	SAK 001
Sample Description	Sakoonang Channel
Date/Time Sampled	06/08/99 @09:30 by JM
Date/Time Received	06/09/99 @09:30 by ZR
NTL Lab Number	NT05082

Analyte	Result	Units	MDL	Method	Preparation Date	Analysis Date	Analyst
Total Coliform by Colilert	Detected	CFU/100ml		SM 9223B	06/09/99	06/10/99	JEP
Fecal Coliform by Colilert	Not Detected	Det/Non Det		SM 9223B	06/09/99	06/10/99	JEP

Approved by: Jerry Pollen
Zachary Richter / Jerry Pollen
Chemist / Lab Tech

NORTHERN TESTING LABORATORIES, INC.

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POUCH 340043 — PRUDHOE BAY, ALASKA 99734 — (907) 659-2145 • FAX 659-2146

Report Date: 10 June 99 Report No.: 99060009

Report of Analysis

Jim Aldrich
Michael Baker Jr., Inc.
100 Cushman St. STE 201
Fairbanks, AK 99701
Phone # 455-8073

Field ID Number	SAK 002		
Sample Description	Sakoonang Channel		
Date/Time Sampled	06/08/99	@09:33	by JM
Date/Time Received	06/09/99	@09:30	by ZR
NTL Lab Number	NT05083		

Analyte	Result	Units	MDL	Method	Preparation Date	Analysis Date	Analyst
Total Coliform by Colilert	Detected	CFU/100ml		SM 9223B	06/09/99	06/10/99	JEP
Fecal Coliform by Colilert	Detected	Det/Non Det		SM 9223B	06/09/99	06/10/99	JEP

Approved by: Jerry Pollen
Zachary Richter / Jerry Pollen
Chemist / Lab Tech

NORTHERN TESTING LABORATORIES, INC.

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POUCH 340043 PRUDHOE BAY, ALASKA 99734 (907) 659-2145 • FAX 659-2146

Report Date: 10 June 99 Report No.: 99060009

Report of Analysis

Jim Aldrich
Michael Baker Jr., Inc.
100 Cushman St. STE 201
Fairbanks, AK 99701
Phone # 455-8073

BLANK (JWA) 10-18-99

Field ID Number	SAK 003		
Sample Description	Sakoonang Channel		
Date/Time Sampled	06/08/99	@09:36	by JM
Date/Time Received	06/09/99	@09:30	by ZR
NTL Lab Number	NT05084		

Analyte	Result	Units	MDL	Method	Preparation Date	Analysis Date	Analyst
Total Coliform by Colilert	Not Detected	CFU/100ml		SM 9223B	06/09/99	06/10/99	JEP
Fecal Coliform by Colilert	Not Detected	Det/Non Det		SM 9223B	06/09/99	06/10/99	JEP

Approved by: Jerry Pollen
Zachary Richter / Jerry Pollen
Chemist / Lab Tech

NORTHERN TESTING LABORATORIES, INC.
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POUCH 340043 PRUDHOE BAY, ALASKA 99734 (907) 659-2145 • FAX 659-2146

Michael Baker, Jr., Inc.
4601 Business Park Blvd., Suite 42
Anchorage AK 99503

Attn: -

Report Date: 07/08/99

Date Arrived: 06/30/99
Date Sampled: 06/25/99
Time Sampled: -
Collected By: TR

MRL = Method Reporting Limit

* Flag Definitions
B = Below Regulatory Min.
H = Above Regulatory Max.

Our Lab #: F185437
Location/Project: Sakoonang F2 170'
Your Sample ID: 0-6'
Sample Matrix: Water
Comments:

Lab#	Method	Parameter	Units	Results *	MRL	Digest Prepared	Date Analyzed
F185437	SM2540-D	Total Suspended Solids	mg/L	32	2.9		07/02/99

RECEIVED

JUL 12 1999

MICHAEL BAKER, JR., INC.

Patricia A Woody

Reported By: Patricia A. Woody
Senior Chemist

NORTHERN TESTING LABORATORIES, INC.

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Michael Baker, Jr., Inc.
4601 Business Park Blvd., Suite 42
Anchorage AK 99503

Attn: -

Report Date: 07/08/99

Date Arrived: 06/30/99
Date Sampled: 06/25/99
Time Sampled: -
Collected By: TR

MRL = Method Reporting Limit

* Flag Definitions
B = Below Regulatory Min.
H = Above Regulatory Max.

Our Lab #: F185438
Location/Project: Sakoonang F2 170'
Your Sample ID: 0-14'
Sample Matrix: Water
Comments:

Lab#	Method	Parameter	Units	Results *	MRL	Digest Prepared	Date Analyzed
F185438	SM2540-D	Total Suspended Solids	mg/L	32	2.6		07/02/99

Patricia A Woody
Reported By: Patricia ~~A. Woody~~
Senior Chemist

NORTHERN TESTING LABORATORIES, INC.

3330 INDUSTRIAL AVENUE FAIRBANKS, ALASKA 99701 (907) 456-3116 • FAX 456-3125
8005 SCHOON STREET ANCHORAGE, ALASKA 99518 (907) 349-1000 • FAX 349-1016
POUCH 340043 PRUDHOE BAY, ALASKA 99734 (907) 659-2145 • FAX 659-2146

Michael Baker, Jr., Inc.
3010 Davis Road
Fairbanks AK 99701

Attn: J Aldrich/J Abrams

Report Date: 08/18/99

Date Arrived: 07/15/99
Date Sampled: 07/14/99
Time Sampled: 1145
Collected By: VR

MRL = Method Reporting Limit

* Flag Definitions
B = Below Regulatory Min.
H = Above Regulatory Max.

Our Lab #: F185811
Location/Project: Sakoonang
Your Sample ID: F2a 122
Sample Matrix: Water
Comments:

Lab#	Method	Parameter	Units	Results	*	MRL	Digest Prepared	Date Analyzed
F185811	EPA 200.7	Aluminum, Total	mg/L	0.36	H	0.06	07/28/99	08/10/99
		Barium, Total	mg/L	0.122		0.007	07/28/99	08/10/99
		Beryllium, Total	mg/L	<MRL		0.0007	07/28/99	08/10/99
		Calcium, Total	mg/L	26.5		0.04	07/28/99	08/10/99
		Copper, Total	mg/L	0.025		0.006	07/28/99	08/10/99
		Iron, Total	mg/L	1.26	H	0.056	07/28/99	08/17/99
		Manganese, Total	mg/L	0.114	H	0.006	07/28/99	08/10/99
		Sodium, Total	mg/L	101		0.1	07/28/99	08/10/99
		Nickel, Total	mg/L	<MRL		0.01	07/28/99	08/10/99
		Zinc, Total	mg/L	<MRL		0.007	07/28/99	08/10/99
	EPA 200.9	Silver, Total	mg/L	<MRL		0.0002	07/28/99	07/29/99
		Arsenic, Total	mg/L	<MRL		0.004	07/28/99	07/28/99
		Cadmium, Total	mg/L	<MRL		0.0001	07/28/99	07/28/99
		Chromium, Total	mg/L	<MRL		0.002	07/28/99	08/02/99
		Antimony, Total	mg/L	<MRL		0.003	07/28/99	08/09/99
		Selenium, Total	mg/L	<MRL		0.004	07/28/99	08/07/99
		Thallium, Total	mg/L	<MRL		0.001	07/28/99	7/29/99
	EPA 245.1	Mercury	mg/L	0.0003		0.0002		07/29/99
	EPA 300.0	Chloride	mg/L	218		4.00		08/10/99
		Fluoride	mg/L	0.07		0.06		07/29/99
		Sulfate	mg/L	31.6		4.0		07/29/99
	SM2120-B	Color, Apparent	Unit	45	H	5		07/15/99
	SM2150-B	Odor	TON	2		1		07/15/99

Reported By: Cindy L. Christian
Laboratory Director

NORTHERN TESTING LABORATORIES, INC.

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8005 SCHOON STREET · ANCHORAGE, ALASKA 99518 · (907) 349-1000 • FAX 349-1016
POUCH 340043 · PRUDHOE BAY, ALASKA 99734 · (907) 659-2145 • FAX 659-2146

Lab#	Method	Parameter	Units	Results *	MRL	Digest Prepared	Date Analyzed
F185811	SM2320-B	Alkalinity as CaCO3	mg/L	73	15		07/16/99
	SM2330-B	Langelier Index	Unit	-0.44			08/17/99
	SM2540-C	Total Dissolved Solids	mg/L	558 H	35		07/15/99
	SM4500-CN -E	Total Cyanide	mg/L	<MRL	0.02		07/20/99
	SM4500-H- B	pH	Unit	7.9			07/15/99
	SM4500-NO 3-E	Nitrate-N	mg/L	0.06	0.02		08/24/99

Reported By: Cindy L. Christian
Laboratory Director

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Michael Baker Jr., Inc.
4601 Business Park Blvd., Ste. 42
Anchorage, AK 99503

Attn: Aldrich/Abrams

Client ID: F2a 122
Client Project #:
Source: Sakoonang
NTL Lab#: A162279
Sample Matrix: Water
Comments:

Report Date: 8/4/99
Date Arrived: 7/16/99
Sample Date: 7/14/99
Sample Time: 11:45
Collected By: V. Robinson

** Legend **
MRL = Method Report Level
MCL = Max. Contaminant Level
B = Present In Method Blank
E = Estimated Value
M = Matrix Interference
H = Above MCL
D = Lost To Dilution

Method	Parameter	Units	Result	MRL	Date Prepared	Date Analyzed
EPA 524.2						
	Benzene	ug/L	<MRL	0.20		7/25/99
	Bromobenzene	ug/L	<MRL	0.20		
	Bromochloromethane	ug/L	<MRL	0.20		
	Bromodichloromethane	ug/L	<MRL	0.20		
	Bromoform	ug/L	<MRL	0.50		
	Bromomethane	ug/L	<MRL	1.00		
	n-Butylbenzene	ug/L	<MRL	0.20		
	sec-Butylbenzene	ug/L	<MRL	0.20		
	tert-Butylbenzene	ug/L	<MRL	0.20		
	Carbon Tetrachloride	ug/L	<MRL	0.20		
	Chlorobenzene	ug/L	<MRL	0.20		
	Chloroethane	ug/L	<MRL	1.00		
	Chloroform	ug/L	<MRL	0.30		
	Chloromethane	ug/L	<MRL	0.50		
	2-Chlorotoluene	ug/L	<MRL	0.20		
	4-Chlorotoluene	ug/L	<MRL	0.20		
	Dibromochloromethane	ug/L	<MRL	0.20		
	Dibromomethane	ug/L	<MRL	0.20		
	1,2-Dichlorobenzene	ug/L	<MRL	0.20		
	1,3-Dichlorobenzene	ug/L	<MRL	0.20		
	1,4-Dichlorobenzene	ug/L	<MRL	0.20		
	Dichlorodifluoromethane	ug/L	<MRL	0.50		
	1,1-Dichloroethane	ug/L	<MRL	0.20		

Stephanie K. Cowling

Reported By: Stephanie K. Cowling
Chemistry Supervisor

NORTHERN TESTING LABORATORIES, INC.

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Michael Baker Jr., Inc.
4601 Business Park Blvd., Ste. 42
Anchorage, AK 99503

Attn: Aldrich/Abrams

Client ID: F2a 122
Client Project #:
Source: Sakoonang
NTL Lab#: A162279
Sample Matrix: Water
Comments:

Report Date: 8/4/99
Date Arrived: 7/16/99
Sample Date: 7/14/99
Sample Time: 11:45
Collected By: V. Robinson

** Legend **

MRL = Method Report Level
MCL = Max. Contaminant Level
B = Present In Method Blank
E = Estimated Value
M = Matrix Interference
H = Above MCL
D = Lost To Dilution

Method	Parameter	Units	Result	MRL	Date Prepared	Date Analyzed
	1,2-Dichloroethane	ug/L	<MRL	0.20		7/25/99
	1,1-Dichloroethene	ug/L	<MRL	0.20		
	cis-1,2-Dichloroethene	ug/L	<MRL	0.20		
	trans-1,2-Dichloroethene	ug/L	<MRL	0.20		
	1,2-Dichloropropane	ug/L	<MRL	0.20		
	1,3-Dichloropropane	ug/L	<MRL	0.20		
	2,2-Dichloropropane	ug/L	<MRL	0.20		
	1,1-Dichloropropene	ug/L	<MRL	0.20		
	cis-1,3-Dichloropropene	ug/L	<MRL	0.20		
	trans-1,3-Dichloropropene	ug/L	<MRL	0.20		
	Ethylbenzene	ug/L	<MRL	0.20		
	Hexachlorobutadiene	ug/L	<MRL	0.20		
	Isopropylbenzene	ug/L	<MRL	0.20		
	p-Isopropyltoluene	ug/L	<MRL	0.20		
	Methylene Chloride	ug/L	<MRL	0.50		
	Naphthalene	ug/L	<MRL	0.20		
	n-Propylbenzene	ug/L	<MRL	0.20		
	Styrene	ug/L	<MRL	0.20		
	1,1,1,2-Tetrachloroethane	ug/L	<MRL	0.20		
	1,1,2,2-Tetrachloroethane	ug/L	<MRL	0.20		
	Tetrachloroethene	ug/L	<MRL	0.20		
	Toluene	ug/L	0.46	0.20		
	1,2,3-Trichlorobenzene	ug/L	<MRL	0.20		
	1,2,4-Trichlorobenzene	ug/L	<MRL	0.20		

Stephanie K. Cowling

Reported By: Stephanie K. Cowling
Chemistry Supervisor

NORTHERN TESTING LABORATORIES, INC.

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POUCH 340043 — PRUDHOE BAY, ALASKA 99734 — (907) 659-2145 • FAX 659-2146

Michael Baker Jr., Inc.
4601 Business Park Blvd., Ste. 42
Anchorage, AK 99503

Attn: Aldrich/Abrams

Report Date: 8/4/99
Date Arrived: 7/16/99
Sample Date: 7/14/99
Sample Time: 11:45
Collected By: V. Robinson

Client ID: F2a 122
Client Project #:
Source: Sakoonang
NTL Lab#: A162279
Sample Matrix: Water
Comments:

** Legend **
MRL = Method Report Level
MCL = Max. Contaminant Level
B = Present In Method Blank
E = Estimated Value
M = Matrix Interference
H = Above MCL
D = Lost To Dilution

Method	Parameter	Units	Result	MRL	Date Prepared	Date Analyzed
	1,1,1-Trichloroethane	ug/L	<MRL	0.20		7/25/99
	1,1,2-Trichloroethane	ug/L	<MRL	0.20		
	Trichloroethene	ug/L	<MRL	0.20		
	Trichlorofluoromethane	ug/L	<MRL	0.50		
	1,2,3-Trichloropropane	ug/L	<MRL	0.20		
	1,2,4-Trimethylbenzene	ug/L	<MRL	0.20		
	1,3,5-Trimethylbenzene	ug/L	<MRL	0.20		
	Vinyl Chloride	ug/L	<MRL	0.50		
	m,p-Xylene	ug/L	0.41	0.20		
	o-Xylene	ug/L	<MRL	0.20		
	Total Trihalomethanes	ug/L	<MRL	0.50		
	4-Bromofluorobenzene	% Recovery	93			
	1,2-Dichlorobenzene-d4	% Recovery	78			
SM 5540 C						
	Foaming Agents (MBAS)	mg/L	<MRL	0.10		7/16/99

Stephanie K. Cowling

Reported By: Stephanie K. Cowling
Chemistry Supervisor

NORTHERN TESTING LABORATORIES, INC.

3330 INDUSTRIAL AVENUE
8005 SCHOON STREET
POUCH 340043

FAIRBANKS, ALASKA 99701
ANCHORAGE, ALASKA 99518
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(907) 349-1000 • FAX 349-1016
(907) 659-2145 • FAX 659-2146

Michael Baker Jr., Inc.
4601 Business Park Blvd., Ste. 42
Anchorage, AK 99503

Attn: Aldrich/Abrams

Client ID: Travel Blank
Client Project #:
Source: Sakoonang
NTL Lab#: A162280
Sample Matrix: Water
Comments:

Report Date: 7/31/99
Date Arrived: 7/16/99
Sample Date: 5/17/99
Sample Time:
Collected By:

** Legend **
MRL = Method Report Level
MCL = Max. Contaminant Level
B = Present In Method Blank
E = Estimated Value
M = Matrix Interference
H = Above MCL
D = Lost To Dilution

Method	Parameter	Units	Result	MRL	Date Prepared	Date Analyzed
EPA 524.2						
	Benzene	ug/L	<MRL	0.20		7/25/99
	Bromobenzene	ug/L	<MRL	0.20		
	Bromochloromethane	ug/L	<MRL	0.20		
	Bromodichloromethane	ug/L	<MRL	0.20		
	Bromoform	ug/L	<MRL	0.50		
	Bromomethane	ug/L	<MRL	1.00		
	n-Butylbenzene	ug/L	<MRL	0.20		
	sec-Butylbenzene	ug/L	<MRL	0.20		
	tert-Butylbenzene	ug/L	<MRL	0.20		
	Carbon Tetrachloride	ug/L	<MRL	0.20		
	Chlorobenzene	ug/L	<MRL	0.20		
	Chloroethane	ug/L	<MRL	1.00		
	Chloroform	ug/L	<MRL	0.30		
	Chloromethane	ug/L	<MRL	0.50		
	2-Chlorotoluene	ug/L	<MRL	0.20		
	4-Chlorotoluene	ug/L	<MRL	0.20		
	Dibromochloromethane	ug/L	<MRL	0.20		
	Dibromomethane	ug/L	<MRL	0.20		
	1,2-Dichlorobenzene	ug/L	<MRL	0.20		
	1,3-Dichlorobenzene	ug/L	<MRL	0.20		
	1,4-Dichlorobenzene	ug/L	<MRL	0.20		
	Dichlorodifluoromethane	ug/L	<MRL	0.50		
	1,1-Dichloroethane	ug/L	<MRL	0.20		

Stephanie K. Cowling

Reported By: Stephanie K. Cowling
Chemistry Supervisor

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Michael Baker Jr., Inc.
4601 Business Park Blvd., Ste. 42
Anchorage, AK 99503

Attn: Aldrich/Abrams

Client ID: Travel Blank
Client Project #:
Source: Sakoonang
NTL Lab#: A162280
Sample Matrix: Water
Comments:

Report Date: 7/31/99
Date Arrived: 7/16/99
Sample Date: 5/17/99
Sample Time:
Collected By:

** Legend **
MRL = Method Report Level
MCL = Max. Contaminant Level
B = Present In Method Blank
E = Estimated Value
M = Matrix Interference
H = Above MCL
D = Lost To Dilution

Method	Parameter	Units	Result	MRL	Date Prepared	Date Analyzed
	1,2-Dichloroethane	ug/L	<MRL	0.20		7/25/99
	1,1-Dichloroethene	ug/L	<MRL	0.20		
	cis-1,2-Dichloroethene	ug/L	<MRL	0.20		
	trans-1,2-Dichloroethene	ug/L	<MRL	0.20		
	1,2-Dichloropropane	ug/L	<MRL	0.20		
	1,3-Dichloropropane	ug/L	<MRL	0.20		
	2,2-Dichloropropane	ug/L	<MRL	0.20		
	1,1-Dichloropropene	ug/L	<MRL	0.20		
	cis-1,3-Dichloropropene	ug/L	<MRL	0.20		
	trans-1,3-Dichloropropene	ug/L	<MRL	0.20		
	Ethylbenzene	ug/L	0.23	0.20		
	Hexachlorobutadiene	ug/L	<MRL	0.20		
	Isopropylbenzene	ug/L	<MRL	0.20		
	p-Isopropyltoluene	ug/L	<MRL	0.20		
	Methylene Chloride	ug/L	<MRL	0.50		
	Naphthalene	ug/L	<MRL	0.20		
	n-Propylbenzene	ug/L	<MRL	0.20		
	Styrene	ug/L	<MRL	0.20		
	1,1,1,2-Tetrachloroethane	ug/L	<MRL	0.20		
	1,1,2,2-Tetrachloroethane	ug/L	<MRL	0.20		
	Tetrachloroethene	ug/L	<MRL	0.20		
	Toluene	ug/L	0.40	0.20		
	1,2,3-Trichlorobenzene	ug/L	<MRL	0.20		
	1,2,4-Trichlorobenzene	ug/L	<MRL	0.20		

Stephanie K. Cowling

Reported By: Stephanie K. Cowling
Chemistry Supervisor

NORTHERN TESTING LABORATORIES, INC.

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Michael Baker Jr., Inc.
4601 Business Park Blvd., Ste. 42
Anchorage, AK 99503

Attn: Aldrich/Abrams

Client ID: Travel Blank
Client Project #:
Source: Sakoonang
NTL Lab#: A162280
Sample Matrix: Water
Comments:

Report Date: 7/31/99
Date Arrived: 7/16/99
Sample Date: 5/17/99
Sample Time:
Collected By:

** Legend **
MRL = Method Report Level
MCL = Max. Contaminant Level
B = Present In Method Blank
E = Estimated Value
M = Matrix Interference
H = Above MCL
D = Lost To Dilution

Method	Parameter	Units	Result	MRL	Date Prepared	Date Analyzed
	1,1,1-Trichloroethane	ug/L	<MRL	0.20		7/25/99
	1,1,2-Trichloroethane	ug/L	<MRL	0.20		
	Trichloroethene	ug/L	<MRL	0.20		
	Trichlorofluoromethane	ug/L	<MRL	0.50		
	1,2,3-Trichloropropane	ug/L	<MRL	0.20		
	1,2,4-Trimethylbenzene	ug/L	<MRL	0.20		
	1,3,5-Trimethylbenzene	ug/L	<MRL	0.20		
	Vinyl Chloride	ug/L	<MRL	0.50		
	m,p-Xylene	ug/L	0.79	0.20		
	o-Xylene	ug/L	<MRL	0.20		
	Total Trihalomethanes	ug/L	<MRL	0.50		
	4-Bromofluorobenzene	% Recovery	91			
	1,2-Dichlorobenzene-d4	% Recovery	69			

Stephanie K. Cowling

Reported By: Stephanie K. Cowling
Chemistry Supervisor

NORTHERN TESTING LABORATORIES, INC.

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DRINKING WATER ANALYSIS REPORT FOR TOTAL COLIFORM BACTERIA

Michael Baker Jr. Inc.
100 Cushman Street, Ste. 201

Fairbanks AK 99701

Date Received: 7/15/99 Time Received: 10:10
Date Analyzed: 7/15/99 Time Analyzed: 14:10
Date Reported: 7/16/99 Time Reported: 15:00
Next Sample Due:

Phone Number:

Fax Number:

Collected by: VLR

Sample Type Untreated Routine

Method of Analysis: MMO-MUG (SM 9223 B)

Comments:

Comments
- S = Satisfactory
- U = Unsatisfactory
- POS = Positive Test Result
- ND = None Detected
- TNTC = Too Numerous To Count (>200 Colonies)
- CG = Confluent Growth
- HSM = Heavy Sediment Masking, Results May Not Be Reliable
- SA = Sample Age >30 Hours But <48 Hours, Results May Not Be Reliable
- Old = Sample Age >48 Hours, Too Old For Analysis
- R = Resample Required
- NT = No Test

* # Colonies/100 ml ** # Colonies/ml

Sample Date	Sample Time	Total* Coliform	E. Coli	Other* Bacteria	HPC** Result	Lab#	Location	Comments
7/14/99	11:53	POS	ND	NT	NT	AK5109	F2A 122	U, Disinfect, R

Marian Ruth Environmental Analyst 7/16/99
Northern Testing Laboratories, Inc Fairbanks, AK

NORTHERN TESTING LABORATORIES, INC.

3330 INDUSTRIAL AVENUE
8005 SCHOON STREET
POUCH 340043

FAIRBANKS, ALASKA 99701
ANCHORAGE, ALASKA 99518
PRUDHOE BAY, ALASKA 99734

(907) 456-3116 • FAX 456-3125
(907) 349-1000 • FAX 349-1016
(907) 659-2145 • FAX 659-2146

Michael Baker, Jr., Inc.
100 Cushman Street, Ste. 201
Fairbanks AK 99701

Attn: J Aldrich/J Abrams

Report Date: 11/24/99

Date Arrived: 07/15/99
Date Sampled: 07/14/99
Time Sampled: 1145
Collected By: VR

MRL = Method Reporting Limit

* Flag Definitions
B = Below Regulatory Min.
H = Above Regulatory Max.

Our Lab #: F185810
Location/Project: Sakoonang
Your Sample ID: F2a 122
Sample Matrix: Water
Comments:

Lab#	Method	Parameter	Units	Results *	MRL	Digest Prepared	Date Analyzed
F185810	EPA 900.0	Gross Alpha	pCi/L	ND@1+/-0.46			11/07/99

Reported By: Cindy L. Christian
Laboratory Director

NORTHERN TESTING LABORATORIES, INC.

3330 INDUSTRIAL AVENUE — FAIRBANKS, ALASKA 99701 — (907) 456-3116 • FAX 456-3125
8005 SCHOON STREET — ANCHORAGE, ALASKA 99518 — (907) 349-1000 • FAX 349-1016
POUCH 340043 — PRUDHOE BAY, ALASKA 99734 — (907) 659-2145 • FAX 659-2146

Michael Baker, Jr., Inc.
3010 Davis Road
Fairbanks AK 99701

Attn: J Aldrich/J Abrams

Report Date: 07/21/99

Date Arrived: 07/15/99
Date Sampled: 07/13/99
Time Sampled: 1440
Collected By: VR

MRL = Method Reporting Limit

* Flag Definitions
B = Below Regulatory Min.
H = Above Regulatory Max.

Our Lab #: F185812
Location/Project: Sakoonang
Your Sample ID: F2a 0-6'
Sample Matrix: Water
Comments:

Lab#	Method	Parameter	Units	Results	*	MRL	Digest Prepared	Date Analyzed
F185812	SM2540-D	Total Suspended Solids	mg/L	10		2.0		07/16/99

Reported By: Cindy L. Christian
Laboratory Director

NORTHERN TESTING LABORATORIES, INC.

3330 INDUSTRIAL AVENUE	FAIRBANKS, ALASKA 99701	(907) 456-3116 • FAX 456-3125
8005 SCHOON STREET	ANCHORAGE, ALASKA 99518	(907) 349-1000 • FAX 349-1016
POUCH 340043	PRUDHOE BAY, ALASKA 99734	(907) 659-2145 • FAX 659-2146

Michael Baker, Jr., Inc.
3010 Davis Road
Fairbanks AK 99701

Attn: J Aldrich/J Abrams

Report Date: 07/21/99

Date Arrived: 07/15/99
Date Sampled: 07/13/99
Time Sampled: 1445
Collected By: VR

MRL = Method Reporting Limit

* Flag Definitions
B = Below Regulatory Min.
H = Above Regulatory Max.

Our Lab #: F185813
Location/Project: Sakoonang
Your Sample ID: F2a 0-16.9'
Sample Matrix: Water
Comments:

Lab#	Method	Parameter	Units	Results	*	MRL	Digest Prepared	Date Analyzed
F185813	SM2540-D	Total Suspended Solids	mg/L	11		2.0		07/16/99

Reported By: Cindy L. Christian
Laboratory Director

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POUCH 340043 PRUDHOE BAY, ALASKA 99734 (907) 659-2145 • FAX 659-2146

Michael Baker, Jr., Inc.
100 Cushman Street, Suite 201
Fairbanks AK 99701

Attn: J Abrams/J Aldrich

Report Date: 09/17/99

Date Arrived: 08/23/99
Date Sampled: 08/19/99
Time Sampled: 2145
Collected By: JA/JA

MRL = Method Reporting Limit

Our Lab #: F186739
Location/Project: Sakoonang Channel
Your Sample ID: F2a 122
Sample Matrix: Water
Comments: Magnesium: 12.7mg/L, Hardness as CaCO3: 134mg/L, analyzed 09/14/99

* Flag Definitions
B = Below Regulatory Min.
H = Above Regulatory Max.

Lab#	Method	Parameter	Units	Results	*	MRL	Digest Prepared	Date Analyzed
F186739	EPA 200.7	Aluminum, Total	mg/L	3.36	H	0.06	08/27/99	09/13/99
		Barium, Total	mg/L	0.139		0.007	08/27/99	09/15/99
		Beryllium, Total	mg/L	<MRL		0.0007	08/27/99	09/13/99
		Calcium, Total	mg/L	32.8		0.44	08/27/99	09/14/99
		Copper, Total	mg/L	0.009		0.006	08/27/99	09/09/99
		Iron, Total	mg/L	4.38	H	0.006	08/27/99	09/15/99
		Manganese, Total	mg/L	0.175	H	0.006	08/27/99	09/15/99
		Sodium, Total	mg/L	40.9		1.1	08/27/99	09/14/99
		Nickel, Total	mg/L	<MRL		0.01	08/27/99	09/13/99
		Zinc, Total	mg/L	0.014		0.007	08/27/99	09/09/99
	EPA 200.9	Silver, Total	mg/L	<MRL		0.0002	08/27/99	09/10/99
		Arsenic, Total	mg/L	<MRL		0.004	08/27/99	09/07/99
		Cadmium, Total	mg/L	0.0001		0.0001	08/27/99	09/13/99
		Chromium, Total	mg/L	0.005		0.002	08/27/99	09/01/99
		Antimony, Total	mg/L	<MRL		0.003	08/27/99	09/15/99
		Selenium, Total	mg/L	<MRL		0.004	08/27/99	09/02/99
		Thallium, Total	mg/L	<MRL		0.001	08/27/99	08/31/99
	EPA 245.1	Mercury	mg/L	<MRL		0.0002		09/02/99
	EPA 300.0	Chloride	mg/L	73.5		3.20		09/01/99
		Fluoride	mg/L	<MRL		0.06		08/23/99
		Sulfate	mg/L	33.9		8.0		09/01/99

Reported By: Cindy L. Christian
Laboratory Director

NORTHERN TESTING LABORATORIES, INC.

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POUCH 340043 PRUDHOE BAY, ALASKA 99734 (907) 659-2145 • FAX 659-2146

Michael Baker Jr., Inc.
100 Cushman Street, Suite 201
Fairbanks AK 99701

Attn: Julene Abrams

Report Date: 10/15/99

Date Arrived: 08/27/99
Date Sampled: 08/25/99
Time Sampled: 1329
Collected By: D. Yi

MRL = Method Reporting Limit

* Flag Definitions
B = Below Regulatory Min.
H = Above Regulatory Max.

Our Lab #: F186852
Location/Project: Sakoonang Channel F2a
Your Sample ID: F2a 122
Sample Matrix: Water
Comments:

Lab#	Method	Parameter	Units	Results *	MRL	Digest Prepared	Date Analyzed
F186852	EPA 200.7	Calcium, Total	mg/L	39.1	0.04	09/23/99	10/13/99
	EPA 300.0	Nitrate-N	mg/L	<MRL	0.03		08/27/99
	SM2120-B	Color, Apparent	Unit	150	50		08/27/99
	SM2130-B	Turbidity	NTU	60	0.50		08/27/99
	SM2150-B	Odor	TON	1	1		08/27/99
	SM2320-B	Alkalinity as CaCO3	mg/L	76	15		08/29/99
	SM2330-B	Langelier Index	Unit	-0.17			10/14/99
	SM2540-C	Total Dissolved Solids	mg/L	680	35		08/31/99
	SM4500-CN -E	Total Cyanide	mg/L	<MRL	0.02		09/08/99
	SM4500-H- B	pH	Unit	8.0			08/27/99

Reported By: Cindy L. Christian
Laboratory Director

NORTHERN TESTING LABORATORIES, INC.

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Michael Baker Jr., Inc.
100 Cushman Street, Suite 201
Fairbanks, AK 99701

Attn: Abrams/Aldrich

Report Date: 9/2/99
Date Arrived: 8/24/99
Sample Date: 8/19/99
Sample Time: 21:45
Collected By: Abrams/Aldrich

Client ID: F2a 122
Client Project #:
Source:
NTL Lab#: A163073
Sample Matrix: Water
Comments:

** Legend **
MRL = Method Report Level
MCL = Max. Contaminant Level
B = Present In Method Blank
E = Estimated Value
M = Matrix Interference
H = Above MCL
D = Lost To Dilution

Method	Parameter	Units	Result	MRL	Date Prepared	Date Analyzed
EPA 524.2						
	Benzene	ug/L	<MRL	0.20		8/29/99
	Bromobenzene	ug/L	<MRL	0.20		
	Bromochloromethane	ug/L	<MRL	0.20		
	Bromodichloromethane	ug/L	<MRL	0.20		
	Bromoform	ug/L	<MRL	0.50		
	Bromomethane	ug/L	<MRL	1.00		
	n-Butylbenzene	ug/L	<MRL	0.20		
	sec-Butylbenzene	ug/L	<MRL	0.20		
	tert-Butylbenzene	ug/L	<MRL	0.20		
	Carbon Tetrachloride	ug/L	<MRL	0.20		
	Chlorobenzene	ug/L	<MRL	0.20		
	Chloroethane	ug/L	<MRL	1.00		
	Chloroform	ug/L	<MRL	0.30		
	Chloromethane	ug/L	<MRL	0.50		
	2-Chlorotoluene	ug/L	<MRL	0.20		
	4-Chlorotoluene	ug/L	<MRL	0.20		
	Dibromochloromethane	ug/L	<MRL	0.20		
	Dibromomethane	ug/L	<MRL	0.20		
	1,2-Dichlorobenzene	ug/L	<MRL	0.20		
	1,3-Dichlorobenzene	ug/L	<MRL	0.20		
	1,4-Dichlorobenzene	ug/L	<MRL	0.20		
	Dichlorodifluoromethane	ug/L	<MRL	0.50		
	1,1-Dichloroethane	ug/L	<MRL	0.20		

Stephanie K. Cowling

Reported By: Stephanie K. Cowling
Chemistry Supervisor

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Michael Baker Jr., Inc.
100 Cushman Street, Suite 201
Fairbanks, AK 99701

Attn: Abrams/Aldrich

Client ID: F2a 122
Client Project #:
Source:
NTL Lab#: A163073
Sample Matrix: Water
Comments:

Report Date: 9/2/99
Date Arrived: 8/24/99
Sample Date: 8/19/99
Sample Time: 21:45
Collected By: Abrams/Aldrich

** Legend **
MRL = Method Report Level
MCL = Max. Contaminant Level
B = Present In Method Blank
E = Estimated Value
M = Matrix Interference
H = Above MCL
D = Lost To Dilution

Method	Parameter	Units	Result	MRL	Date Prepared	Date Analyzed
	1,2-Dichloroethane	ug/L	<MRL	0.20		8/29/99
	1,1-Dichloroethene	ug/L	<MRL	0.20		
	cis-1,2-Dichloroethene	ug/L	<MRL	0.20		
	trans-1,2-Dichloroethene	ug/L	<MRL	0.20		
	1,2-Dichloropropane	ug/L	<MRL	0.20		
	1,3-Dichloropropane	ug/L	<MRL	0.20		
	2,2-Dichloropropane	ug/L	<MRL	0.20		
	1,1-Dichloropropene	ug/L	<MRL	0.20		
	cis-1,3-Dichloropropene	ug/L	<MRL	0.20		
	trans-1,3-Dichloropropene	ug/L	<MRL	0.20		
	Ethylbenzene	ug/L	0.26	0.20		
	Hexachlorobutadiene	ug/L	<MRL	0.20		
	Isopropylbenzene	ug/L	<MRL	0.20		
	p-Isopropyltoluene	ug/L	<MRL	0.20		
	Methylene Chloride	ug/L	<MRL	0.50		
	Naphthalene	ug/L	<MRL	0.20		
	n-Propylbenzene	ug/L	<MRL	0.20		
	Styrene	ug/L	<MRL	0.20		
	1,1,1,2-Tetrachloroethane	ug/L	<MRL	0.20		
	1,1,2,2-Tetrachloroethane	ug/L	<MRL	0.20		
	Tetrachloroethene	ug/L	<MRL	0.20		
	Toluene	ug/L	1.50	0.20		
	1,2,3-Trichlorobenzene	ug/L	<MRL	0.20		
	1,2,4-Trichlorobenzene	ug/L	<MRL	0.20		

Stephanie K. Cowling

Reported By: Stephanie K. Cowling
Chemistry Supervisor

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Michael Baker Jr., Inc.
100 Cushman Street, Suite 201
Fairbanks, AK 99701

Attn: Abrams/Aldrich

Client ID: F2a 122
Client Project #:
Source:
NTL Lab#: A163073
Sample Matrix: Water
Comments:

Report Date: 9/2/99
Date Arrived: 8/24/99
Sample Date: 8/19/99
Sample Time: 21:45
Collected By: Abrams/Aldrich

** Legend **

MRL = Method Report Level
MCL = Max. Contaminant Level
B = Present In Method Blank
E = Estimated Value
M = Matrix Interference
H = Above MCL
D = Lost To Dilution

Method	Parameter	Units	Result	MRL	Date Prepared	Date Analyzed
	1,1,1-Trichloroethane	ug/L	<MRL	0.20		8/29/99
	1,1,2-Trichloroethane	ug/L	<MRL	0.20		
	Trichloroethene	ug/L	<MRL	0.20		
	Trichlorofluoromethane	ug/L	<MRL	0.50		
	1,2,3-Trichloropropane	ug/L	<MRL	0.20		
	1,2,4-Trimethylbenzene	ug/L	0.33	0.20		
	1,3,5-Trimethylbenzene	ug/L	0.74	0.20		
	Vinyl Chloride	ug/L	<MRL	0.50		
	m,p-Xylene	ug/L	1.15	0.20		
	o-Xylene	ug/L	1.37	0.20		
	Total Trihalomethanes	ug/L	<MRL	0.50		
	4-Bromofluorobenzene	% Recovery	93			
	1,2-Dichlorobenzene-d4	% Recovery	73			

Stephanie K. Cowling

Reported By: Stephanie K. Cowling
Chemistry Supervisor

NORTHERN TESTING LABORATORIES, INC.

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Michael Baker Jr., Inc.
100 Cushman Street, Suite 201
Fairbanks, AK 99701

Attn: J. Abrams

Report Date: 9/1/99
Date Arrived: 8/27/99
Sample Date: 8/25/99
Sample Time: 13:27
Collected By: D. Yi

Client ID: F2a 122
Client Project #:
Source: Sakoonang Channel F2a
NTL Lab#: A163182
Sample Matrix: Water
Comments:

** Legend **
MRL = Method Report Level
MCL = Max. Contaminant Level
B = Present In Method Blank
E = Estimated Value
M = Matrix Interference
H = Above MCL
D = Lost To Dilution

Method	Parameter	Units	Result	MRL	Date Prepared	Date Analyzed
SM 5540 C						
	Foaming Agents (MBAS)	mg/L	<MRL	0.10		8/27/99

Stephanie K. Cowling

Reported By: Stephanie K. Cowling
Chemistry Supervisor

NORTHERN TESTING LABORATORIES, INC.

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Michael Baker Jr., Inc.
100 Cushman Street, Suite 201
Fairbanks, AK 99701

Attn: Abrams/Aldrich

Client ID: Travel Blank
Client Project #:
Source:
NTL Lab#: A163074
Sample Matrix: Water
Comments:

Report Date: 9/2/99
Date Arrived: 8/24/99
Sample Date: 7/9/99
Sample Time: 9:40
Collected By:

** Legend **

MRL = Method Report Level
MCL = Max. Contaminant Level
B = Present In Method Blank
E = Estimated Value
M = Matrix Interference
H = Above MCL
D = Lost To Dilution

Method	Parameter	Units	Result	MRL	Date Prepared	Date Analyzed
EPA 524.2						
	Benzene	ug/L	<MRL	0.20		8/30/99
	Bromobenzene	ug/L	<MRL	0.20		
	Bromochloromethane	ug/L	<MRL	0.20		
	Bromodichloromethane	ug/L	<MRL	0.20		
	Bromoform	ug/L	<MRL	0.50		
	Bromomethane	ug/L	<MRL	1.00		
	n-Butylbenzene	ug/L	<MRL	0.20		
	sec-Butylbenzene	ug/L	<MRL	0.20		
	tert-Butylbenzene	ug/L	<MRL	0.20		
	Carbon Tetrachloride	ug/L	<MRL	0.20		
	Chlorobenzene	ug/L	<MRL	0.20		
	Chloroethane	ug/L	<MRL	1.00		
	Chloroform	ug/L	<MRL	0.30		
	Chloromethane	ug/L	<MRL	0.50		
	2-Chlorotoluene	ug/L	<MRL	0.20		
	4-Chlorotoluene	ug/L	<MRL	0.20		
	Dibromochloromethane	ug/L	<MRL	0.20		
	Dibromomethane	ug/L	<MRL	0.20		
	1,2-Dichlorobenzene	ug/L	<MRL	0.20		
	1,3-Dichlorobenzene	ug/L	<MRL	0.20		
	1,4-Dichlorobenzene	ug/L	<MRL	0.20		
	Dichlorodifluoromethane	ug/L	<MRL	0.50		
	1,1-Dichloroethane	ug/L	<MRL	0.20		

Stephanie K. Cowling

Reported By: Stephanie K. Cowling
Chemistry Supervisor

NORTHERN TESTING LABORATORIES, INC.

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Michael Baker Jr., Inc.
100 Cushman Street, Suite 201
Fairbanks, AK 99701

Attn: Abrams/Aldrich

Client ID: Travel Blank
Client Project #:
Source:
NTL Lab#: A163074
Sample Matrix: Water
Comments:

Report Date: 9/2/99
Date Arrived: 8/24/99
Sample Date: 7/9/99
Sample Time: 9:40
Collected By:

** Legend **
MRL = Method Report Level
MCL = Max. Contaminant Level
B = Present In Method Blank
E = Estimated Value
M = Matrix Interference
H = Above MCL
D = Lost To Dilution

Method	Parameter	Units	Result	MRL	Date Prepared	Date Analyzed
	1,2-Dichloroethane	ug/L	<MRL	0.20		8/30/99
	1,1-Dichloroethene	ug/L	<MRL	0.20		
	cis-1,2-Dichloroethene	ug/L	<MRL	0.20		
	trans-1,2-Dichloroethene	ug/L	<MRL	0.20		
	1,2-Dichloropropane	ug/L	<MRL	0.20		
	1,3-Dichloropropane	ug/L	<MRL	0.20		
	2,2-Dichloropropane	ug/L	<MRL	0.20		
	1,1-Dichloropropene	ug/L	<MRL	0.20		
	cis-1,3-Dichloropropene	ug/L	<MRL	0.20		
	trans-1,3-Dichloropropene	ug/L	<MRL	0.20		
	Ethylbenzene	ug/L	<MRL	0.20		
	Hexachlorobutadiene	ug/L	<MRL	0.20		
	Isopropylbenzene	ug/L	<MRL	0.20		
	p-Isopropyltoluene	ug/L	<MRL	0.20		
	Methylene Chloride	ug/L	<MRL	0.50		
	Naphthalene	ug/L	<MRL	0.20		
	n-Propylbenzene	ug/L	<MRL	0.20		
	Styrene	ug/L	<MRL	0.20		
	1,1,1,2-Tetrachloroethane	ug/L	<MRL	0.20		
	1,1,2,2-Tetrachloroethane	ug/L	<MRL	0.20		
	Tetrachloroethene	ug/L	<MRL	0.20		
	Toluene	ug/L	<MRL	0.20		
	1,2,3-Trichlorobenzene	ug/L	<MRL	0.20		
	1,2,4-Trichlorobenzene	ug/L	<MRL	0.20		

Stephanie K. Cowling

Reported By: Stephanie K. Cowling
Chemistry Supervisor

NORTHERN TESTING LABORATORIES, INC.

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Michael Baker Jr., Inc.
100 Cushman Street, Suite 201
Fairbanks, AK 99701

Attn: Abrams/Aldrich

Client ID: Travel Blank
Client Project #:
Source:
NTL Lab#: A163074
Sample Matrix: Water
Comments:

Report Date: 9/2/99
Date Arrived: 8/24/99
Sample Date: 7/9/99
Sample Time: 9:40
Collected By:

** Legend **
MRL = Method Report Level
MCL = Max. Contaminant Level
B = Present In Method Blank
E = Estimated Value
M = Matrix Interference
H = Above MCL
D = Lost To Dilution

Method	Parameter	Units	Result	MRL	Date Prepared	Date Analyzed
	1,1,1-Trichloroethane	ug/L	<MRL	0.20		8/30/99
	1,1,2-Trichloroethane	ug/L	<MRL	0.20		
	Trichloroethene	ug/L	<MRL	0.20		
	Trichlorofluoromethane	ug/L	<MRL	0.50		
	1,2,3-Trichloropropane	ug/L	<MRL	0.20		
	1,2,4-Trimethylbenzene	ug/L	<MRL	0.20		
	1,3,5-Trimethylbenzene	ug/L	<MRL	0.20		
	Vinyl Chloride	ug/L	<MRL	0.50		
	m,p-Xylene	ug/L	<MRL	0.20		
	o-Xylene	ug/L	<MRL	0.20		
	Total Trihalomethanes	ug/L	<MRL	0.50		
	4-Bromofluorobenzene	% Recovery	92			
	1,2-Dichlorobenzene-d4	% Recovery	75			

Stephanie K. Cowling

Reported By: Stephanie K. Cowling
Chemistry Supervisor

NORTHERN TESTING LABORATORIES, INC.

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Report Date: 21 August 99

Report No.: 99080037

Report of Analysis

Jim Aldrich
Michael Baker Jr., Inc.
100 Cushman St. STE 201
Fairbanks, AK 99701
Phone # 455-8073

Field ID Number	SAK F2A		
Sample Description	Water		
Date/Time Sampled	08/19/99	@12:31	by J.A.
Date/Time Received	08/19/99	@16:00	by ZR
NTL Lab Number	NT05431		

Analyte	Result	Units	MDL	Method	Preparation Date	Analysis Date	Analyst
Total Coliform by Colilert	Detected	CFU/100ml		SM 9223B	08/19/99	08/20/99	ZR

Approved by: Zachary Richter / Jerry Pollen
Chemist / Lab Tech

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Michael Baker, Jr., Inc.
100 Cushman Street, Suite 201
Fairbanks AK 99701

Attn: J Abrams/J Aldrich

Report Date: 11/24/99

Date Arrived: 08/23/99
Date Sampled: 08/19/99
Time Sampled: 1930
Collected By: JA/JA

MRL = Method Reporting Limit

* Flag Definitions
B = Below Regulatory Min.
H = Above Regulatory Max.

Our Lab #: F186740
Location/Project: Sakoonang Channel
Your Sample ID: F2a 122
Sample Matrix: Water
Comments:

Lab#	Method	Parameter	Units	Results	*	MRL	Digest Prepared	Date Analyzed
F186740	EPA 900.0	Gross Alpha	pCi/L	1.33+/-0.56				11/12/99

Reported By: Cindy L. Christian
Laboratory Director

NORTHERN TESTING LABORATORIES, INC.

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Michael Baker, Jr., Inc.
100 Cushman Street, Suite 201
Fairbanks AK 99701

Attn: Julene Abrams

Report Date: 08/31/99

Date Arrived: 08/27/99
Date Sampled: 08/19/99
Time Sampled: -
Collected By: D. Yi

MRL = Method Reporting Limit

* Flag Definitions
B = Below Regulatory Min.
H = Above Regulatory Max.

Our Lab #: F186853
Location/Project: Sakoonang Channel F2a
Your Sample ID: F2a 122 0-6'
Sample Matrix: Water
Comments:

Lab#	Method	Parameter	Units	Results *	MRL	Digest Prepared	Date Analyzed
F186853	SM2540-D	Total Suspended Solids	mg/L	96	4.0		08/27/99

Reported By: Cindy L. Christian
Laboratory Director

NORTHERN TESTING LABORATORIES, INC.

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8005 SCHOON STREET
POUCH 340043

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(907) 659-2145 • FAX 659-2146

Michael Baker, Jr., Inc.
100 Cushman Street, Suite 201
Fairbanks AK 99701

Attn: Julene Abrams

Report Date: 08/31/99

Date Arrived: 08/27/99
Date Sampled: 08/19/99
Time Sampled: -
Collected By: D. Yi

MRL = Method Reporting Limit

* Flag Definitions
B = Below Regulatory Min.
H = Above Regulatory Max.

Our Lab #: F186854
Location/Project: Sakoonang Channel F2a
Your Sample ID: F2a 122 0-15.6'
Sample Matrix: Water
Comments:

Lab#	Method	Parameter	Units	Results *	MRL	Digest Prepared	Date Analyzed
F186854	SM2540-D	Total Suspended Solids	mg/L	88	4.0		08/27/99

Reported By: Cindy L. Christian
Laboratory Director

NORTHERN TESTING LABORATORIES, INC.

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Michael Baker Jr., Inc.
100 Cushman Street, Suite 201
Fairbanks AK 99701

Attn: Julene Abrams

Report Date: 10/18/99

Date Arrived: 09/23/99
Date Sampled: 09/21/99
Time Sampled: 0642
Collected By: S Tolan

MRL = Method Reporting Limit

Our Lab #: F187563
Location/Project: 1999 Water Monitoring
Your Sample ID: F2a 122
Sample Matrix: Water
Comments: Hardness as CaCO3= 610 mg/L; Analyzed 12/13/99. Revised Transmittal

* Flag Definitions
B = Below Regulatory Min.
H = Above Regulatory Max.

Lab#	Method	Parameter	Units	Results	*	MRL	Digest Prepared	Date Analyzed
F187563	EPA 200.7	Aluminum, Total	mg/L	0.35	H	0.06	09/23/99	10/15/99
		Barium, Total	mg/L	0.171		0.007	09/23/99	10/14/99
		Beryllium, Total	mg/L	<MRL		0.0007	09/23/99	10/13/99
		Calcium, Total	mg/L	80.2		0.04	09/23/99	10/13/99
		Copper, Total	mg/L	<MRL		0.006	09/23/99	09/29/99
		Iron, Total	mg/L	1.24	H	0.006	09/23/99	10/14/99
		Manganese, Total	mg/L	0.190	H	0.006	09/23/99	10/14/99
		Sodium, Total	mg/L	845	H	1.1	09/23/99	10/13/99
		Nickel, Total	mg/L	<MRL		0.01	09/23/99	10/14/99
		Zinc, Total	mg/L	<MRL		0.007	09/23/99	09/29/99
	EPA 200.9	Silver, Total	mg/L	<MRL		0.0002	09/23/99	09/29/99
		Arsenic, Total	mg/L	<MRL		0.004	09/23/99	10/14/99
		Cadmium, Total	mg/L	0.0001		0.0001	09/23/99	10/14/99
		Chromium, Total	mg/L	0.003		0.002	09/23/99	10/14/99
		Antimony, Total	mg/L	<MRL		0.003	09/23/99	10/15/99
		Selenium, Total	mg/L	<MRL		0.004	09/23/99	09/27/99
		Thallium, Total	mg/L	<MRL		0.001	09/23/99	10/11/99
	EPA 245.1	Mercury	mg/L	<MRL		0.0002		09/29/99
	EPA 300.0	Chloride	mg/L	1700	H	40.00		10/14/99
		Fluoride	mg/L	0.15		0.12		10/14/99
		Nitrate-N	mg/L	<MRL		0.03		09/23/99
		Sulfate	mg/L	237		40.0		10/14/99
	SM2120-B	Color, Apparent	Unit	35	H	5		09/23/99

Marci L. Irwin

Reported By: Marci L. Irwin
Chemistry Supervisor

NORTHERN TESTING LABORATORIES, INC.

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8005 SCHOON STREET ANCHORAGE, ALASKA 99518 (907) 349-1000 • FAX 349-1016
POUCH 340043 PRUDHOE BAY, ALASKA 99734 (907) 659-2145 • FAX 659-2146

Lab#	Method	Parameter	Units	Results	*	MRL	Digest Prepared	Date Analyzed
F187563	SM2150-B	Odor	TON	4	H	1		09/23/99
	SM2320-B	Alkalinity as CaCO3	mg/L	82		15		09/28/99
	SM2330-B	Langelier Index	Unit	-0.09				10/15/99
	SM2540-C	Total Dissolved Solids	mg/L	3020	H	35		09/23/99
	SM4500-CN -E	Total Cyanide	mg/L	<MRL		0.02		09/22/99
	SM4500-H- B	pH	Unit	7.9				09/23/99

Marci L. Irwin

Reported By: Marci L. Irwin
Chemistry Supervisor

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Michael Baker Jr., Inc.
100 Cushman Street, Suite 201
Fairbanks, AK 99701

Attn: Julene Abrams

Report Date: 10/12/99
Date Arrived: 9/24/99
Sample Date: 9/21/99
Sample Time: 6:40
Collected By: S. Tolan

Client ID: F2a 122
Client Project #:
Source: 1999 Water Monitoring
NTL Lab#: A163921
Sample Matrix: Water
Comments: Foaming Agent expired prior to arrival at laboratory.

** Legend **
MRL = Method Report Level
MCL = Max. Contaminant Level
B = Present In Method Blank
E = Estimated Value
M = Matrix Interference
H = Above MCL
D = Lost To Dilution

Method	Parameter	Units	Result	MRL	Date Prepared	Date Analyzed
EPA 524.2						
	Benzene	ug/L	<MRL	0.20		9/24/99
	Bromobenzene	ug/L	<MRL	0.20		
	Bromochloromethane	ug/L	<MRL	0.20		
	Bromodichloromethane	ug/L	<MRL	0.20		
	Bromoform	ug/L	<MRL	0.50		
	Bromomethane	ug/L	<MRL	1.00		
	n-Butylbenzene	ug/L	<MRL	0.20		
	sec-Butylbenzene	ug/L	<MRL	0.20		
	tert-Butylbenzene	ug/L	<MRL	0.20		
	Carbon Tetrachloride	ug/L	<MRL	0.20		
	Chlorobenzene	ug/L	<MRL	0.20		
	Chloroethane	ug/L	<MRL	1.00		
	Chloroform	ug/L	<MRL	0.30		
	Chloromethane	ug/L	<MRL	0.50		
	2-Chlorotoluene	ug/L	<MRL	0.20		
	4-Chlorotoluene	ug/L	<MRL	0.20		
	Dibromochloromethane	ug/L	<MRL	0.20		
	Dibromomethane	ug/L	<MRL	0.20		
	1,2-Dichlorobenzene	ug/L	<MRL	0.20		
	1,3-Dichlorobenzene	ug/L	<MRL	0.20		
	1,4-Dichlorobenzene	ug/L	<MRL	0.20		
	Dichlorodifluoromethane	ug/L	<MRL	0.50		
	1,1-Dichloroethane	ug/L	<MRL	0.20		

Stephanie K. Cowling
Reported By: Stephanie K. Cowling
Chemistry Supervisor

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Michael Baker Jr., Inc.
100 Cushman Street, Suite 201
Fairbanks, AK 99701

Attn: Julene Abrams

Report Date: 10/12/99
Date Arrived: 9/24/99
Sample Date: 9/21/99
Sample Time: 6:40
Collected By: S. Tolan

Client ID: F2a 122
Client Project #:
Source: 1999 Water Monitoring
NTL Lab#: A163921
Sample Matrix: Water
Comments: Foaming Agent expired prior to arrival at laboratory.

** Legend **
MRL = Method Report Level
MCL = Max. Contaminant Level
B = Present In Method Blank
E = Estimated Value
M = Matrix Interference
H = Above MCL
D = Lost To Dilution

Method	Parameter	Units	Result	MRL	Date Prepared	Date Analyzed
	1,2-Dichloroethane	ug/L	<MRL	0.20		9/24/99
	1,1-Dichloroethene	ug/L	<MRL	0.20		
	cis-1,2-Dichloroethene	ug/L	<MRL	0.20		
	trans-1,2-Dichloroethene	ug/L	<MRL	0.20		
	1,2-Dichloropropane	ug/L	<MRL	0.20		
	1,3-Dichloropropane	ug/L	<MRL	0.20		
	2,2-Dichloropropane	ug/L	<MRL	0.20		
	1,1-Dichloropropene	ug/L	<MRL	0.20		
	cis-1,3-Dichloropropene	ug/L	<MRL	0.20		
	trans-1,3-Dichloropropene	ug/L	<MRL	0.20		
	Ethylbenzene	ug/L	<MRL	0.20		
	Hexachlorobutadiene	ug/L	<MRL	0.20		
	Isopropylbenzene	ug/L	<MRL	0.20		
	p-Isopropyltoluene	ug/L	<MRL	0.20		
	Methylene Chloride	ug/L	<MRL	0.50		
	Naphthalene	ug/L	<MRL	0.20		
	n-Propylbenzene	ug/L	<MRL	0.20		
	Styrene	ug/L	<MRL	0.20		
	1,1,1,2-Tetrachloroethane	ug/L	<MRL	0.20		
	1,1,2,2-Tetrachloroethane	ug/L	<MRL	0.20		
	Tetrachloroethene	ug/L	<MRL	0.20		
	Toluene	ug/L	<MRL	0.20		
	1,2,3-Trichlorobenzene	ug/L	<MRL	0.20		
	1,2,4-Trichlorobenzene	ug/L	<MRL	0.20		

Stephanie K. Cowling

Reported By: Stephanie K. Cowling
Chemistry Supervisor

NORTHERN TESTING LABORATORIES, INC.

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Michael Baker Jr., Inc.
100 Cushman Street, Suite 201
Fairbanks, AK 99701

Attn: Julene Abrams

Report Date: 10/12/99
Date Arrived: 9/24/99
Sample Date: 9/21/99
Sample Time: 6:40
Collected By: S. Tolan

Client ID: F2a 122
Client Project #:
Source: 1999 Water Monitoring
NTL Lab#: A163921
Sample Matrix: Water
Comments: Foaming Agent expired prior to arrival at laboratory.

** Legend **
MRL = Method Report Level
MCL = Max. Contaminant Level
B = Present In Method Blank
E = Estimated Value
M = Matrix Interference
H = Above MCL
D = Lost To Dilution

Method	Parameter	Units	Result	MRL	Date Prepared	Date Analyzed
	1,1,1-Trichloroethane	ug/L	<MRL	0.20		9/24/99
	1,1,2-Trichloroethane	ug/L	<MRL	0.20		
	Trichloroethene	ug/L	<MRL	0.20		
	Trichlorofluoromethane	ug/L	<MRL	0.50		
	1,2,3-Trichloropropane	ug/L	<MRL	0.20		
	1,2,4-Trimethylbenzene	ug/L	<MRL	0.20		
	1,3,5-Trimethylbenzene	ug/L	<MRL	0.20		
	Vinyl Chloride	ug/L	<MRL	0.50		
	m,p-Xylene	ug/L	<MRL	0.20		
	o-Xylene	ug/L	<MRL	0.20		
	Total Trihalomethanes	ug/L	<MRL	0.50		
	4-Bromofluorobenzene	% Recovery	108			
	1,2-Dichlorobenzene-d4	% Recovery	100			
SM 5540 C						
	Foaming Agents (MBAS)	mg/L	<MRL	0.10		9/29/99

Stephanie K. Cowling

Reported By: Stephanie K. Cowling
Chemistry Supervisor

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Michael Baker Jr., Inc.
100 Cushman Street, Suite 201
Fairbanks, AK 99701

Attn: Julene Abrams

Report Date: 9/27/99
Date Arrived: 9/24/99
Sample Date:
Sample Time:
Collected By:

Client ID: Travel Blank
Client Project #:
Source: 1999 Water Monitoring
NTL Lab#: A163923
Sample Matrix: Water
Comments:

** Legend **

MRL = Method Report Level
MCL = Max. Contaminant Level
B = Present In Method Blank
E = Estimated Value
M = Matrix Interference
H = Above MCL
D = Lost To Dilution

Method	Parameter	Units	Result	MRL	Date Prepared	Date Analyzed
EPA 524.2						
	Benzene	ug/L	<MRL	0.20		9/24/99
	Bromobenzene	ug/L	<MRL	0.20		
	Bromochloromethane	ug/L	<MRL	0.20		
	Bromodichloromethane	ug/L	<MRL	0.20		
	Bromoform	ug/L	<MRL	0.50		
	Bromomethane	ug/L	<MRL	1.00		
	n-Butylbenzene	ug/L	<MRL	0.20		
	sec-Butylbenzene	ug/L	<MRL	0.20		
	tert-Butylbenzene	ug/L	<MRL	0.20		
	Carbon Tetrachloride	ug/L	<MRL	0.20		
	Chlorobenzene	ug/L	<MRL	0.20		
	Chloroethane	ug/L	<MRL	1.00		
	Chloroform	ug/L	<MRL	0.30		
	Chloromethane	ug/L	<MRL	0.50		
	2-Chlorotoluene	ug/L	<MRL	0.20		
	4-Chlorotoluene	ug/L	<MRL	0.20		
	Dibromochloromethane	ug/L	<MRL	0.20		
	Dibromomethane	ug/L	<MRL	0.20		
	1,2-Dichlorobenzene	ug/L	<MRL	0.20		
	1,3-Dichlorobenzene	ug/L	<MRL	0.20		
	1,4-Dichlorobenzene	ug/L	<MRL	0.20		
	Dichlorodifluoromethane	ug/L	<MRL	0.50		
	1,1-Dichloroethane	ug/L	<MRL	0.20		

Stephanie K. Cowling

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Chemistry Supervisor

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Michael Baker Jr., Inc.
100 Cushman Street, Suite 201
Fairbanks, AK 99701

Attn: Julene Abrams

Client ID: Travel Blank
Client Project #:
Source: 1999 Water Monitoring
NTL Lab#: A163923
Sample Matrix: Water
Comments:

Report Date: 9/27/99
Date Arrived: 9/24/99
Sample Date:
Sample Time:
Collected By:

** Legend **
MRL = Method Report Level
MCL = Max. Contaminant Level
B = Present In Method Blank
E = Estimated Value
M = Matrix Interference
H = Above MCL
D = Lost To Dilution

Method	Parameter	Units	Result	MRL	Date Prepared	Date Analyzed
	1,2-Dichloroethane	ug/L	<MRL	0.20		9/24/99
	1,1-Dichloroethene	ug/L	<MRL	0.20		
	cis-1,2-Dichloroethene	ug/L	<MRL	0.20		
	trans-1,2-Dichloroethene	ug/L	<MRL	0.20		
	1,2-Dichloropropane	ug/L	<MRL	0.20		
	1,3-Dichloropropane	ug/L	<MRL	0.20		
	2,2-Dichloropropane	ug/L	<MRL	0.20		
	1,1-Dichloropropene	ug/L	<MRL	0.20		
	cis-1,3-Dichloropropene	ug/L	<MRL	0.20		
	trans-1,3-Dichloropropene	ug/L	<MRL	0.20		
	Ethylbenzene	ug/L	<MRL	0.20		
	Hexachlorobutadiene	ug/L	<MRL	0.20		
	Isopropylbenzene	ug/L	<MRL	0.20		
	p-Isopropyltoluene	ug/L	<MRL	0.20		
	Methylene Chloride	ug/L	<MRL	0.50		
	Naphthalene	ug/L	<MRL	0.20		
	n-Propylbenzene	ug/L	<MRL	0.20		
	Styrene	ug/L	<MRL	0.20		
	1,1,1,2-Tetrachloroethane	ug/L	<MRL	0.20		
	1,1,2,2-Tetrachloroethane	ug/L	<MRL	0.20		
	Tetrachloroethene	ug/L	<MRL	0.20		
	Toluene	ug/L	<MRL	0.20		
	1,2,3-Trichlorobenzene	ug/L	<MRL	0.20		
	1,2,4-Trichlorobenzene	ug/L	<MRL	0.20		

Stephanie K. Cowling

Reported By: Stephanie K. Cowling
Chemistry Supervisor

NORTHERN TESTING LABORATORIES, INC.
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Michael Baker Jr., Inc.
100 Cushman Street, Suite 201
Fairbanks, AK 99701

Attn: Julene Abrams

Client ID: Travel Blank
Client Project #:
Source: 1999 Water Monitoring
NTL Lab#: A163923
Sample Matrix: Water
Comments:

Report Date: 9/27/99
Date Arrived: 9/24/99
Sample Date:
Sample Time:
Collected By:

** Legend **
MRL = Method Report Level
MCL = Max. Contaminant Level
B = Present In Method Blank
E = Estimated Value
M = Matrix Interference
H = Above MCL
D = Lost To Dilution

Method	Parameter	Units	Result	MRL	Date Prepared	Date Analyzed
	1,1,1-Trichloroethane	ug/L	<MRL	0.20		9/24/99
	1,1,2-Trichloroethane	ug/L	<MRL	0.20		
	Trichloroethene	ug/L	<MRL	0.20		
	Trichlorofluoromethane	ug/L	<MRL	0.50		
	1,2,3-Trichloropropane	ug/L	<MRL	0.20		
	1,2,4-Trimethylbenzene	ug/L	<MRL	0.20		
	1,3,5-Trimethylbenzene	ug/L	<MRL	0.20		
	Vinyl Chloride	ug/L	<MRL	0.50		
	m,p-Xylene	ug/L	<MRL	0.20		
	o-Xylene	ug/L	<MRL	0.20		
	Total Trihalomethanes	ug/L	<MRL	0.50		
	4-Bromofluorobenzene	% Recovery	109			
	1,2-Dichlorobenzene-d4	% Recovery	99			

Stephanie K Cowling

Reported By: Stephanie K. Cowling
Chemistry Supervisor

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Report Date: 02 October 99

Report No.: 99090041

Report of Analysis

Jim Aldrich
Michael Baker Jr., Inc.
100 Cushman St. STE 201
Fairbanks, AK 99701
Phone # 455-8073

Field ID Number	S2A122
Sample Description	Water from Sak River
Date/Time Sampled	09/28/99 @15:20
Date/Time Received	09/29/99 @14:00 by ZR
NTL Lab Number	NT05612

Analyte	Result	Units	MDL	Method	Preparation Date	Analysis Date	Analyst
Total Coliform by Colilert	Detected	CFU/100ml		SM 9223B	09/29/99	09/30/99	ZR

Approved by:
Zachary Richter / Jerry Pollen
Chemist / Lab Tech

NORTHERN TESTING LABORATORIES, INC.

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POUCH 340043 PRUDHOE BAY, ALASKA 99734 (907) 659-2145 • FAX 659-2146

Michael Baker Jr., Inc.
100 Cushman Street, Suite 201
Fairbanks AK 99701

Attn: Julene Abrams

Report Date: 09/30/99

Date Arrived: 09/27/99
Date Sampled: 09/21/99
Time Sampled: -
Collected By: JDA

MRL = Method Reporting Limit

* Flag Definitions
B = Below Regulatory Min.
H = Above Regulatory Max.

Our Lab #: F187655
Location/Project: Alpine
Your Sample ID: F2a 122 0-6' MBJ
Sample Matrix: Water
Comments:

Lab#	Method	Parameter	Units	Results *	MRL	Digest Prepared	Date Analyzed
F187655	SM2540-D	Total Suspended Solids	mg/L	11	1.2		09/27/99

Reported By: Cindy L. Christian
Laboratory Director

NORTHERN TESTING LABORATORIES, INC.

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Michael Baker Jr., Inc.
100 Cushman Street, Suite 201
Fairbanks AK 99701

Attn: Julene Abrams

Report Date: 09/30/99

Date Arrived: 09/27/99
Date Sampled: 09/21/99
Time Sampled: -
Collected By: JDA

MRL = Method Reporting Limit

* Flag Definitions
B = Below Regulatory Min.
H = Above Regulatory Max.

Our Lab #: F187656
Location/Project: Alpine
Your Sample ID: F2a 122 0-17.6' MBJ
Sample Matrix: Water
Comments:

Lab#	Method	Parameter	Units	Results	*	MRL	Digest Prepared	Date Analyzed
F187656	SM2540-D	Total Suspended Solids	mg/L	8.0		2.5		09/27/99

Reported By: Cindy L. Christian
Laboratory Director

1999 Lake 93-12 And Lake 93-13 Data

NORTHERN TESTING LABORATORIES, INC.

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Michael Baker, Jr.
100 Cushman Street, Suite 201
Fairbanks AK 99701

Attn: Jim Aldrich

Report Date: 07/21/99

Date Arrived: 07/16/99
Date Sampled: 07/14/99
Time Sampled: -
Collected By: -

MRL = Method Reporting Limit

* Flag Definitions
B = Below Regulatory Min.
H = Above Regulatory Max.

Our Lab #: F185902
Location/Project: -
Your Sample ID: L93-12 4/28
Sample Matrix: Water
Comments:

Lab#	Method	Parameter	Units	Results *	MRL	Digest Prepared	Date Analyzed
F185902	SM2540-D	Total Suspended Solids	mg/L	12	1.9		07/16/99

Reported By: Cindy L. Christian
Laboratory Director

NORTHERN TESTING LABORATORIES, INC.

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Michael Baker, Jr., Inc.
100 Cushman Street, Suite 201
Fairbanks AK 99701

Attn: Julene Abrams

Report Date: 08/31/99

Date Arrived: 08/27/99
Date Sampled: 08/25/99
Time Sampled: -
Collected By: D. Yi

MRL = Method Reporting Limit

* Flag Definitions
B = Below Regulatory Min.
H = Above Regulatory Max.

Our Lab #: F186855
Location/Project: Sakoonang Channel F2a
Your Sample ID: L93-13
Sample Matrix: Water
Comments:

Lab#	Method	Parameter	Units	Results *	MRL	Digest Prepared	Date Analyzed
F186855	SM2540-D	Total Suspended Solids	mg/L	<MRL	1.7		08/27/99

Reported By: Cindy L. Christian
Laboratory Director

NORTHERN TESTING LABORATORIES, INC.

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POUCH 340043, PRUDHOE BAY, ALASKA 99734, (907) 659-2145 • FAX 659-2146

Michael Baker Jr., Inc.
100 Cushman Street, Suite 201
Fairbanks AK 99701

Attn: Julene Abrams

Report Date: 09/30/99

Date Arrived: 09/27/99
Date Sampled: 09/21/99
Time Sampled: -
Collected By: JDA

MRL = Method Reporting Limit

* Flag Definitions
B = Below Regulatory Min.
H = Above Regulatory Max.

Our Lab #: F187654
Location/Project: Alpine
Your Sample ID: L93-12 MBJ
Sample Matrix: Water
Comments:

Lab#	Method	Parameter	Units	Results *	MRL	Digest Prepared	Date Analyzed
F187654	SM2540-D	Total Suspended Solids	mg/L	<MRL	1.1		09/27/99

Reported By: Cindy L. Christian
Laboratory Director

NORTHERN TESTING LABORATORIES, INC.

3330 INDUSTRIAL AVENUE, FAIRBANKS, ALASKA 99701, (907) 456-3116 • FAX 456-3125
8005 SCHOON STREET, ANCHORAGE, ALASKA 99518, (907) 349-1000 • FAX 349-1016
POUCH 340043, PRUDHOE BAY, ALASKA 99734, (907) 659-2145 • FAX 659-2146

Michael Baker, Jr.
100 Cushman Street, Suite 201
Fairbanks AK 99701

Attn: Jim Aldrich

Report Date: 07/21/99

Date Arrived: 07/16/99
Date Sampled: 07/14/99
Time Sampled: -
Collected By: -

MRL = Method Reporting Limit

* Flag Definitions
B = Below Regulatory Min.
H = Above Regulatory Max.

Our Lab #: F185900
Location/Project: -
Your Sample ID: L93-13 6/25
Sample Matrix: Water
Comments:

Lab#	Method	Parameter	Units	Results *	MRL	Digest Prepared	Date Analyzed
F185900	SM2540-D	Total Suspended Solids	mg/L	14	1.2		07/16/99

Reported By: Cindy L. Christian
Laboratory Director

NORTHERN TESTING LABORATORIES, INC.

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POUCH 340043 PRUDHOE BAY, ALASKA 99734 (907) 659-2145 • FAX 659-2146

Michael Baker, Jr.
100 Cushman Street, Suite 201
Fairbanks AK 99701

Attn: Jim Aldrich

Report Date: 07/21/99

Date Arrived: 07/16/99
Date Sampled: 07/14/99
Time Sampled: -
Collected By: -

MRL = Method Reporting Limit

* Flag Definitions
B = Below Regulatory Min.
H = Above Regulatory Max.

Our Lab #: F185901
Location/Project: -
Your Sample ID: L93-13 7/13
Sample Matrix: Water
Comments:

Lab#	Method	Parameter	Units	Results *	MRL	Digest Prepared	Date Analyzed
F185901	SM2540-D	Total Suspended Solids	mg/L	230	4.0		07/16/99

Reported By: Cindy L. Christian
Laboratory Director

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POUCH 340043 PRUDHOE BAY, ALASKA 99734 (907) 659-2145 • FAX 659-2146

Michael Baker Jr. Inc.
100 Cushman Street, Suite 201
Fairbanks AK 99701

Attn: Julene Abrams

Report Date: 09/03/99

Date Arrived: 09/01/99
Date Sampled: 08/25/99
Time Sampled: -
Collected By: JA

MRL = Method Reporting Limit

* Flag Definitions
B = Below Regulatory Min.
H = Above Regulatory Max.

Our Lab #: F186949
Location/Project: 1999 Alpine Monitoring
Your Sample ID: L93-13
Sample Matrix: Water
Comments:

Lab#	Method	Parameter	Units	Results *	MRL	Digest Prepared	Date Analyzed
F186949	SM2540-D	Total Suspended Solids	mg/L	9.2	1.2		09/01/99

Reported By: Cindy L. Christian
Laboratory Director

NORTHERN TESTING LABORATORIES, INC.

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POUCH 340043 PRUDHOE BAY, ALASKA 99734 (907) 659-2145 • FAX 659-2146

Michael Baker Jr., Inc.
100 Cushman Street, Suite 201
Fairbanks AK 99701

Attn: Julene Abrams

Report Date: 09/30/99

Date Arrived: 09/27/99
Date Sampled: 09/20/99
Time Sampled: -
Collected By: JDA

MRL = Method Reporting Limit

* Flag Definitions
B = Below Regulatory Min.
H = Above Regulatory Max.

Our Lab #: F187653
Location/Project: Alpine
Your Sample ID: L93-13
Sample Matrix: Water
Comments:

Lab#	Method	Parameter	Units	Results *	MRL	Digest Prepared	Date Analyzed
F187653	SM2540-D	Total Suspended Solids	mg/L	2.9	1.4		09/27/99

Reported By: Cindy L. Christian
Laboratory Director

1998 Lake 93-12 Data

NORTHERN TESTING LABORATORIES, INC.

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8005 SCHOON STREET ANCHORAGE, ALASKA 99518 (907) 349-1000 • FAX 349-1016

Michael Baker, Jr. Inc.
4601 Business Park Blvd.; Ste 42
Anchorage AK 99503

Attn: Jim McGinnis, PE

Report Date: 03/09/98

Date Arrived: 02/04/98
Date Sampled: 02/01/98
Time Sampled: -
Collected By: -

MDL = Method Detection Limit

* Flag Definitions
B = Below Regulatory Min.
H = Above Regulatory Max.

Our Lab #: F176285
Location/Project: Alpine Camp Water System
Your Sample ID: 93-12
Sample Matrix: Water
Comments:

Lab#	Method	Parameter	Units	Results	*	MDL	Date Prepared	Date Analyzed
F176285	EPA 150.1	pH	Unit	7.2				02/04/98
	EPA 180.1	Turbidity	NTU	0.35		0.05		02/04/98
	EPA 200.7	Aluminum	mg/L	<MDL		0.055		02/13/98
		Barium	mg/L	0.092		0.002		02/13/98
		Beryllium	mg/L	<MDL		0.0005		02/13/98
		Calcium	mg/L	11.2		0.016		03/02/98
		Iron	mg/L	0.012		0.010		02/12/98
		Hardness as CaCO3	mg/L	45.1		0.1		03/06/98
		Magnesium	mg/L	4.16		0.073		03/06/98
		Manganese	mg/L	0.056	H	0.003		02/13/98
		Sodium	mg/L	7.45		0.120		02/18/98
		Nickel	mg/L	<MDL		0.028		02/11/98
		Zinc	mg/L	<MDL		0.008		02/13/98
	EPA 200.9	Silver	mg/L	<MDL		0.0001		02/17/98
		Arsenic	mg/L	<MDL		0.003		02/09/98
		Cadmium	mg/L	<MDL		0.0001		02/11/98
		Chromium	mg/L	<MDL		0.002		02/11/98
		Copper	mg/L	<MDL		0.005		02/10/98
		Antimony	mg/L	<MDL		0.003		02/12/98
		Selenium	mg/L	<MDL		0.003		02/18/98
		Thallium	mg/L	<MDL		0.001		02/13/98
	EPA 245.1	Mercury	mg/L	0.0002		0.0002		02/16/98
	EPA 300.0	Chloride	mg/L	14.3		1.00		02/09/98

Cindy L Christian

Reported By: Cindy L. Christian
Laboratory Director

NORTHERN TESTING LABORATORIES, INC.
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Lab#	Method	Parameter	Units	Results *	MDL	Date Prepared	Date Analyzed
F176285	EPA 300.0	Fluoride	mg/L	<MDL	0.04		02/04/98
		Nitrate-N	mg/L	0.08	0.03		02/04/98
		Sulfate	mg/L	<MDL	0.20		02/04/98
	SM2120-B	Color, Apparent	Unit	<MDL	5		02/04/98
	SM2150-B	Odor	TON	8 H	1		02/04/98
	SM2320-B	Alkalinity as CaCO3	mg/L	44	1		02/11/98
		Bicarbonate Alkalinity (as CaCO3)	mg/L	44	1		02/11/98
	SM2330-B	Langelier Index	Unit	-1.6			03/04/98
	SM2540-C	Total Dissolved Solids	mg/L	54	20		02/17/98
	SM4500-CN -E	Total Cyanide	mg/L	<MDL	0.02		02/11/98

Cindy L Christian

Reported By: Cindy L. Christian
Laboratory Director

NORTHERN TESTING LABORATORIES, INC.
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8005 SCHOON STREET ANCHORAGE, ALASKA 99518 (907) 349-1000 • FAX 349-1016

Michael Baker, Jr., Inc.
4601 Business Park Blvd., Ste. 42
Anchorage, AK 99503

Attn: Jim McGinnis, P.E.

Client ID: 93-12
Client Project #:
Source: Alpine Camp Water System
NTL Lab#: A154122
Sample Matrix: Water
Comments:

Report Date: 2/20/98
Date Arrived: 2/5/98
Sample Date: 2/1/98
Sample Time:
Collected By:

** Legend **
MRL = Method Report Level
MCL = Max. Contaminant Level
B = Present In Method Blank
E = Estimated Value
M = Matrix Interference
H = Above MCL
D = Lost To Dilution

Method	Parameter	Units	Result	MRL	Date Prepared	Date Analyzed
EPA 524.2						
	Benzene	ug/L	<MRL	0.20		2/12/98
	Bromobenzene	ug/L	<MRL	0.20		
	Bromochloromethane	ug/L	<MRL	0.20		
	Bromodichloromethane	ug/L	<MRL	0.20		
	Bromoform	ug/L	0.66	0.50		
	Bromomethane	ug/L	<MRL	1.00		
	n-Butylbenzene	ug/L	<MRL	0.20		
	sec-Butylbenzene	ug/L	<MRL	0.20		
	tert-Butylbenzene	ug/L	<MRL	0.20		
	Carbon Tetrachloride	ug/L	<MRL	0.20		
	Chlorobenzene	ug/L	<MRL	0.20		
	Chloroethane	ug/L	<MRL	1.00		
	Chloroform	ug/L	<MRL	0.30		
	Chloromethane	ug/L	<MRL	0.50		
	2-Chlorotoluene	ug/L	<MRL	0.20		
	4-Chlorotoluene	ug/L	<MRL	0.20		
	Dibromochloromethane	ug/L	<MRL	0.20		
	Dibromomethane	ug/L	<MRL	0.20		
	1,2-Dichlorobenzene	ug/L	<MRL	0.20		
	1,3-Dichlorobenzene	ug/L	<MRL	0.20		
	1,4-Dichlorobenzene	ug/L	<MRL	0.20		
	Dichlorodifluoromethane	ug/L	<MRL	0.50		
	1,1-Dichloroethane	ug/L	<MRL	0.20		

Reported By: Jorma K. Kuusisto
Chemistry Supervisor

NORTHERN TESTING LABORATORIES, INC.

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Michael Baker, Jr., Inc.
4601 Business Park Blvd., Ste. 42
Anchorage, AK 99503

Attn: Jim McGinnis, P.E.

Client ID: 93-12
Client Project #:
Source: Alpine Camp Water System
NTL Lab#: A154122
Sample Matrix: Water
Comments:

Report Date: 2/20/98
Date Arrived: 2/5/98
Sample Date: 2/1/98
Sample Time:
Collected By:

** Legend **

MRL = Method Report Level
MCL = Max. Contaminant Level
B = Present In Method Blank
E = Estimated Value
M = Matrix Interference
H = Above MCL
D = Lost To Dilution

Method	Parameter	Units	Result	MRL	Date Prepared	Date Analyzed
	1,2-Dichloroethane	ug/L	<MRL	0.20		2/12/98
	1,1-Dichloroethene	ug/L	<MRL	0.20		
	cis-1,2-Dichloroethene	ug/L	<MRL	0.20		
	trans-1,2-Dichloroethene	ug/L	<MRL	0.20		
	1,2-Dichloropropane	ug/L	<MRL	0.20		
	1,3-Dichloropropane	ug/L	<MRL	0.20		
	2,2-Dichloropropane	ug/L	<MRL	0.20		
	1,1-Dichloropropene	ug/L	<MRL	0.20		
	cis-1,3-Dichloropropene	ug/L	<MRL	0.20		
	trans-1,3-Dichloropropene	ug/L	<MRL	0.20		
	Ethylbenzene	ug/L	<MRL	0.20		
	Hexachlorobutadiene	ug/L	<MRL	0.20		
	Isopropylbenzene	ug/L	<MRL	0.20		
	p-Isopropyltoluene	ug/L	<MRL	0.20		
	Methylene Chloride	ug/L	<MRL	0.50		
	Naphthalene	ug/L	<MRL	0.20		
	n-Propylbenzene	ug/L	<MRL	0.20		
	Styrene	ug/L	<MRL	0.20		
	1,1,1,2-Tetrachloroethane	ug/L	<MRL	0.20		
	1,1,2,2-Tetrachloroethane	ug/L	<MRL	0.20		
	Tetrachloroethene	ug/L	<MRL	0.20		
	Toluene	ug/L	0.48	0.20		
	1,2,3-Trichlorobenzene	ug/L	<MRL	0.20		
	1,2,4-Trichlorobenzene	ug/L	<MRL	0.20		

Reported By: Jorma K. Kuusisto
Chemistry Supervisor

NORTHERN TESTING LABORATORIES, INC.

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Michael Baker, Jr., Inc.
4601 Business Park Blvd., Ste. 42
Anchorage, AK 99503

Attn: Jim McGinnis, P.E.

Client ID: 93-12
Client Project #:
Source: Alpine Camp Water System
NTL Lab#: A154122
Sample Matrix: Water
Comments:

Report Date: 2/20/98
Date Arrived: 2/5/98
Sample Date: 2/1/98
Sample Time:
Collected By:

** Legend **
MRL = Method Report Level
MCL = Max. Contaminant Level
B = Present In Method Blank
E = Estimated Value
M = Matrix Interference
H = Above MCL
D = Lost To Dilution

Method	Parameter	Units	Result	MRL	Date Prepared	Date Analyzed
	1,1,1-Trichloroethane	ug/L	<MRL	0.20		2/12/98
	1,1,2-Trichloroethane	ug/L	<MRL	0.20		
	Trichloroethene	ug/L	<MRL	0.20		
	Trichlorofluoromethane	ug/L	<MRL	0.50		
	1,2,3-Trichloropropane	ug/L	<MRL	0.20		
	1,2,4-Trimethylbenzene	ug/L	<MRL	0.20		
	1,3,5-Trimethylbenzene	ug/L	<MRL	0.20		
	Vinyl Chloride	ug/L	<MRL	0.50		
	p,m-Xylene	ug/L	<MRL	0.20		
	o-Xylene	ug/L	<MRL	0.20		
	Total Xylenes	ug/L	<MRL	0.20		
	Total Trihalomethanes	ug/L	0.66	0.50		
	BFB (Surr)	% Recovery	101			
	1,2-DCB-d4 (Surr)	% Recovery	102			
SM 5540 C						
	Foaming Agents	mg/L	<MRL	0.10	2/6/98	2/7/98

Reported By: Jorma K. Kuusisto
Chemistry Supervisor

RECEIVED

MAR 1 3 1998

MICHAEL BAKER JR. INC.

NORTHERN TESTING LABORATORIES, INC.

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DRINKING WATER ANALYSIS REPORT FOR TOTAL COLIFORM BACTERIA

Michael Baker Jr., Inc.
4601 Business Park Blvd.; Ste. 42

Anchorage AK 99503

Date Received: 2/2/98 Time Received: 15:10
Date Analyzed: 2/2/98 Time Analyzed:
Date Reported: 2/4/98 Time Reported: 10:11
Next Sample Due:

Phone Number:

Fax Number:

Collected by:

Sample Type Private water Systems

Method of Analysis: MMO-MUG (SM 9223 B)

Purchase Order #: Report #98020001
Comments: Lounsbury & Assoc.

Comments
- S = Satisfactory
- U = Unsatisfactory
- POS = Positive Test Result
- ND = None Detected
- TNTC = Too Numerous To Count (>200 Colonies)
- CG = Confluent Growth
- HSM = Heavy Sediment Masking, Results May Not Be Reliable
- SA = Sample Age >30 Hours But <48 Hours, Results May Not Be Reliable
- Old = Sample Age >48 Hours, Too Old For Analysis
- R = Resample Required
- NT = No Test

* # Colonies/100 ml ** # Colonies/ml

Sample Date	Sample Time	Total* Coliform	E. Coli	Other* Bacteria	HPC** Result	Lab#	Location	Comments
2/1/98	12:00	ND	ND	NT	NT	NT02912	93-10	Satisfactory
2/1/98	12:01	ND	ND	NT	NT	NT02913	93-12	Satisfactory
2/1/98	12:02	ND	ND	NT	NT	NT02914	93-13	Satisfactory
2/1/98	12:03	ND	ND	NT	NT	NT02915	92-82	Satisfactory

Marian Ruth

Marian Ruth Environmental Analyst 2/4/98
Northern Testing Laboratories, Inc Fairbanks, AK

NORTHERN TESTING LABORATORIES, INC.

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POUCH 340043 | PRUDHOE BAY, ALASKA 99734 | (907) 659-2145 • FAX 659-2146

Michael Baker, Jr. Inc.
4601 Business Park Blvd.; Ste 42
Anchorage AK 99503

Attn: Jim McGinnis, PE

Report Date: 04/28/98

Date Arrived: 02/04/98
Date Sampled: 02/01/98
Time Sampled: -
Collected By: -

MRL = Method Reporting Limit

* Flag Definitions
B = Below Regulatory Min.
H = Above Regulatory Max.

Our Lab #: F176289
Location/Project: Alpine Camp Water System
Your Sample ID: 93-12
Sample Matrix: Water
Comments:

Lab#	Method	Parameter	Units	Results *	MRL	Digest Prepared	Date Analyzed
F176289	EPA 900.0	Gross Alpha	pCi/L	ND@1+/-0.28			04/01/98

Cindy L. Christian

Reported By: Cindy L. Christian
Laboratory Director

NORTHERN TESTING LABORATORIES, INC.
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Michael Baker, Jr. Inc.
4601 Business Park Blvd.; Ste 42
Anchorage AK 99503

Attn: Jim McGinnis, PE

Report Date: 03/26/98

Date Arrived: 03/16/98
Date Sampled: 03/13/98
Time Sampled: 1030
Collected By: DD

MRL = Method Reporting Limit

Our Lab #: F176934
Location/Project: Alpine Camp Water System
Your Sample ID: 93-12
Sample Matrix: Water
Comments:

* Flag Definitions
B = Below Regulatory Min.
H = Above Regulatory Max.

Lab#	Method	Parameter	Units	Results *	MRL	Digest Prepared	Date Analyzed
F176934	EPA 150.1	pH	Unit	7.0			03/17/98
	EPA 180.1	Turbidity	NTU	0.60	0.05		03/16/98
	EPA 200.7	Aluminum	mg/L	<MRL	0.055		03/17/98
		Barium	mg/L	0.12	0.002		03/17/98
		Beryllium	mg/L	<MRL	0.0005		03/20/98
		Calcium	mg/L	15.1	0.016		03/19/98
		Iron	mg/L	0.054	0.010		03/17/98
		Hardness as CaCO3	mg/L	59.7	0.1		03/19/98
		Magnesium	mg/L	5.36	0.073		03/19/98
		Manganese	mg/L	0.005	0.003		03/17/98
		Sodium	mg/L	9.42	0.120		03/17/98
		Nickel	mg/L	<MRL	0.028		03/17/98
		Zinc	mg/L	0.013	0.008		03/17/98
	EPA 200.9	Silver	mg/L	<MRL	0.0001		03/20/98
		Arsenic	mg/L	<MRL	0.003		03/19/98
		Cadmium	mg/L	<MRL	0.0001		03/25/98
		Chromium	mg/L	<MRL	0.002		03/24/98
		Copper	mg/L	<MRL	0.005		03/19/98
		Antimony	mg/L	<MRL	0.003		03/24/98
		Selenium	mg/L	<MRL	0.003		03/25/98
		Thallium	mg/L	<MRL	0.001		03/19/98
	EPA 245.1	Mercury	mg/L	<MRL	0.0002		03/20/98
	EPA 300.0	Chloride	mg/L	17	1.40		03/18/98

Cindy L Christian

Reported By: Cindy L. Christian
Laboratory Director

NORTHERN TESTING LABORATORIES, INC.
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8005 SCHOON STREET ANCHORAGE, ALASKA 99518 (907) 349-1000 • FAX 349-1016

Lab#	Method	Parameter	Units	Results *	MRL	Digest Prepared	Date Analyzed
F176934	EPA 300.0	Fluoride	mg/L	0.04	0.04		03/17/98
		Nitrate-N	mg/L	0.06	0.03		03/17/98
		Sulfate	mg/L	0.30	0.20		03/17/98
	SM2120-B	Color, Apparent	Unit	10	5		03/16/98
	SM2150-B	Odor	TON	2	1		03/16/98
	SM2320-B	Alkalinity as CaCO3	mg/L	57	1		03/20/98
		Bicarbonate Alkalinity (as CaCO3)	mg/L	57	1		03/20/98
	SM2330-B	Langelier Index	Unit	-1.6			03/25/98
	SM2540-C	Total Dissolved Solids	mg/L	115	25		03/18/98
	SM4500-CN -E	Total Cyanide	mg/L	<MRL	0.02		03/23/98

Cindy L Christian

Reported By: Cindy L. Christian
Laboratory Director

NORTHERN TESTING LABORATORIES, INC.

3330 INDUSTRIAL AVENUE FAIRBANKS, ALASKA 99701 (907) 456-3116 • FAX 456-3125
8005 SCHOON STREET ANCHORAGE, ALASKA 99518 (907) 349-1000 • FAX 349-1016

Michael Baker, Inc.
4601 Business Park Blvd., Ste. 42
Anchorage, AK 99503

Attn: Jim McGinnis

Report Date: 3/26/98
Date Arrived: 3/17/98
Sample Date: 3/13/98
Sample Time: 10:30
Collected By: DD

Client ID: 93-12 (F176934)
Client Project #:
Source:
NTL Lab#: A154552
Sample Matrix: Water
Comments:

** Legend **

MRL = Method Report Level
MCL = Max. Contaminant Level
B = Present In Method Blank
E = Estimated Value
M = Matrix Interference
H = Above MCL
D = Lost To Dilution

Method	Parameter	Units	Result	MRL	Date Prepared	Date Analyzed
EPA 524.2						
	Benzene	ug/L	<MRL	0.20		3/18/98
	Bromobenzene	ug/L	<MRL	0.20		
	Bromochloromethane	ug/L	<MRL	0.20		
	Bromodichloromethane	ug/L	<MRL	0.20		
	Bromoform	ug/L	<MRL	0.50		
	Bromomethane	ug/L	<MRL	1.00		
	n-Butylbenzene	ug/L	<MRL	0.20		
	sec-Butylbenzene	ug/L	<MRL	0.20		
	tert-Butylbenzene	ug/L	<MRL	0.20		
	Carbon Tetrachloride	ug/L	<MRL	0.20		
	Chlorobenzene	ug/L	<MRL	0.20		
	Chloroethane	ug/L	<MRL	1.00		
	Chloroform	ug/L	<MRL	0.30		
	Chloromethane	ug/L	<MRL	0.50		
	2-Chlorotoluene	ug/L	<MRL	0.20		
	4-Chlorotoluene	ug/L	<MRL	0.20		
	Dibromochloromethane	ug/L	<MRL	0.20		
	Dibromomethane	ug/L	<MRL	0.20		
	1,2-Dichlorobenzene	ug/L	<MRL	0.20		
	1,3-Dichlorobenzene	ug/L	<MRL	0.20		
	1,4-Dichlorobenzene	ug/L	<MRL	0.20		
	Dichlorodifluoromethane	ug/L	<MRL	0.50		
	1,1-Dichloroethane	ug/L	<MRL	0.20		

Reported By: Jorma K. Kuusisto
Chemistry Supervisor

NORTHERN TESTING LABORATORIES, INC.

3330 INDUSTRIAL AVENUE FAIRBANKS, ALASKA 99701 (907) 456-3116 • FAX 456-3125
8005 SCHOON STREET ANCHORAGE, ALASKA 99518 (907) 349-1000 • FAX 349-1016

Michael Baker, Inc.
4601 Business Park Blvd., Ste. 42
Anchorage, AK 99503

Attn: Jim McGinnis

Client ID: 93-12 (F176934)
Client Project #:
Source:
NTL Lab#: A154552
Sample Matrix: Water
Comments:

Report Date: 3/26/98
Date Arrived: 3/17/98
Sample Date: 3/13/98
Sample Time: 10:30
Collected By: DD

** Legend **

MRL = Method Report Level
MCL = Max. Contaminant Level
B = Present In Method Blank
E = Estimated Value
M = Matrix Interference
H = Above MCL
D = Lost To Dilution

Method	Parameter	Units	Result	MRL	Date Prepared	Date Analyzed
	1,2-Dichloroethane	ug/L	<MRL	0.20		3/18/98
	1,1-Dichloroethene	ug/L	<MRL	0.20		
	cis-1,2-Dichloroethene	ug/L	<MRL	0.20		
	trans-1,2-Dichloroethene	ug/L	<MRL	0.20		
	1,2-Dichloropropane	ug/L	<MRL	0.20		
	1,3-Dichloropropane	ug/L	<MRL	0.20		
	2,2-Dichloropropane	ug/L	<MRL	0.20		
	1,1-Dichloropropene	ug/L	<MRL	0.20		
	cis-1,3-Dichloropropene	ug/L	<MRL	0.20		
	trans-1,3-Dichloropropene	ug/L	<MRL	0.20		
	Ethylbenzene	ug/L	<MRL	0.20		
	Hexachlorobutadiene	ug/L	<MRL	0.20		
	Isopropylbenzene	ug/L	<MRL	0.20		
	p-Isopropyltoluene	ug/L	<MRL	0.20		
	Methylene Chloride	ug/L	<MRL	0.50		
	Naphthalene	ug/L	<MRL	0.20		
	n-Propylbenzene	ug/L	<MRL	0.20		
	Styrene	ug/L	<MRL	0.20		
	1,1,1,2-Tetrachloroethane	ug/L	<MRL	0.20		
	1,1,2,2-Tetrachloroethane	ug/L	<MRL	0.20		
	Tetrachloroethene	ug/L	<MRL	0.20		
	Toluene	ug/L	<MRL	0.20		
	1,2,3-Trichlorobenzene	ug/L	<MRL	0.20		
	1,2,4-Trichlorobenzene	ug/L	<MRL	0.20		

Jorma Kuusisto

Reported By: Jorma K. Kuusisto
Chemistry Supervisor

NORTHERN TESTING LABORATORIES, INC.

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Michael Baker, Inc.
4601 Business Park Blvd., Ste. 42
Anchorage, AK 99503

Attn: Jim McGinnis

Client ID: 93-12 (F176934)
Client Project #:
Source:
NTL Lab#: A154552
Sample Matrix: Water
Comments:

Report Date: 3/26/98
Date Arrived: 3/17/98
Sample Date: 3/13/98
Sample Time: 10:30
Collected By: DD

** Legend **
MRL = Method Report Level
MCL = Max. Contaminant Level
B = Present In Method Blank
E = Estimated Value
M = Matrix Interference
H = Above MCL
D = Lost To Dilution

Method	Parameter	Units	Result	MRL	Date Prepared	Date Analyzed
	1,1,1-Trichloroethane	ug/L	<MRL	0.20		3/18/98
	1,1,2-Trichloroethane	ug/L	<MRL	0.20		
	Trichloroethene	ug/L	<MRL	0.20		
	Trichlorofluoromethane	ug/L	<MRL	0.50		
	1,2,3-Trichloropropane	ug/L	<MRL	0.20		
	1,2,4-Trimethylbenzene	ug/L	<MRL	0.20		
	1,3,5-Trimethylbenzene	ug/L	<MRL	0.20		
	Vinyl Chloride	ug/L	<MRL	0.50		
	m,p-Xylene	ug/L	<MRL	0.20		
	o-Xylene	ug/L	<MRL	0.20		
	Total Trihalomethanes	ug/L	<MRL	0.50		
	BFB (Surr)	% Recovery	88			
	1,2-DCB-d4 (Surr)	% Recovery	83			
SM 5540 C						
	Foaming Agents (MBAS)	mg/L	<MRL	0.10	3/19/98	3/19/98

Reported By: Jorma K. Kuusisto
Chemistry Supervisor

NORTHERN TESTING LABORATORIES, INC.

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POUCH 340043 PRUDHOE BAY, ALASKA 99734 (907) 659-2145 • FAX 659-2146

Report Date: 15 March 98

Report No.: 98030021

Report of Analysis

Bonnie Buteyn
Northern Testing Laboratories
3330 Industrial Avenue
Fairbanks, AK 99701
(907)456-3116

Field ID Number	93-12		
Sample Description	AK1973		
Date/Time Sampled	03/13/98	@10:30	by DD
Date/Time Received	03/14/98	@08:29	by JEP
NTL Lab Number	NT03020		

Analyte	Result	Units	MDL	Method	Preparation Date	Analysis Date	Analyst
Total Coliform P-A	Not detected			SM 9221D	03/14/98	03/15/98	JEP

Approved by: Jerry Pollen
Don Cook / Jerry Pollen
Chemist / Lab Tech

NORTHERN TESTING LABORATORIES, INC.

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POUCH 340043 PRUDHOE BAY, ALASKA 99734 (907) 659-2145 • FAX 659-2146

Michael Baker, Jr. Inc.
4601 Business Park Blvd.; Ste 42
Anchorage AK 99503

Attn: Jim McGinnis, PE

Report Date: 04/28/98

Date Arrived: 03/16/98
Date Sampled: 03/13/98
Time Sampled: 1030
Collected By: DD

MRL = Method Reporting Limit

* Flag Definitions
B = Below Regulatory Min.
H = Above Regulatory Max.

Our Lab #: F176941
Location/Project: Alpine Camp Water System
Your Sample ID: 93-12
Sample Matrix: Water
Comments:

Lab#	Method	Parameter	Units	Results *	MRL	Digest Prepared	Date Analyzed
F176941	EPA 900.0	Gross Alpha	pCi/L	ND@1+/-0.29			04/02/98

Reported By: Cindy L. Christian
Laboratory Director

NORTHERN TESTING LABORATORIES, INC.

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POUCH 340043 PRUDHOE BAY, ALASKA 99734 (907) 659-2145 • FAX 659-2146

Michael Baker, Jr. Inc.
4601 Business Park Blvd.; Ste 42
Anchorage AK 99503

Attn: Jim McGinnis, PE

Report Date: 04/13/98

Date Arrived: 03/30/98
Date Sampled: 03/27/98
Time Sampled: 1030
Collected By: LL

MRL = Method Reporting Limit

* Flag Definitions
B = Below Regulatory Min.
H = Above Regulatory Max.

Our Lab #: F177161
Location/Project: Alpine Camp Water System
Your Sample ID: 93-12
Sample Matrix: Water
Comments:

Lab#	Method	Parameter	Units	Results *	MRL	Digest Prepared	Date Analyzed
F177161	EPA 150.1	pH	Unit	7.1			03/30/98
	EPA 180.1	Turbidity	NTU	0.60	0.05		03/30/98
	EPA 200.7	Aluminum	mg/L	<MRL	0.055		04/06/98
		Barium	mg/L	0.106	0.002		04/03/98
		Beryllium	mg/L	<MRL	0.0005		04/06/98
		Calcium	mg/L	12.1	0.016		04/06/98
		Iron	mg/L	0.078	0.010		04/06/98
		Hardness as CaCO3	mg/L	49.8	0.1		04/06/98
		Magnesium	mg/L	4.73	0.073		04/06/98
		Manganese	mg/L	0.009	0.003		04/06/98
		Sodium	mg/L	8.95	0.120		04/02/98
		Nickel	mg/L	<MRL	0.028		04/06/98
		Zinc	mg/L	<MRL	0.008		04/06/98
	EPA 200.9	Silver	mg/L	<MRL	0.0001		04/01/98
		Arsenic	mg/L	<MRL	0.003		04/10/98
		Cadmium	mg/L	0.0001	0.0001		04/01/98
		Chromium	mg/L	<MRL	0.002		04/07/98
		Copper	mg/L	<MRL	0.005		04/08/98
		Antimony	mg/L	<MRL	0.003		04/10/98
		Selenium	mg/L	<MRL	0.003		04/04/98
		Thallium	mg/L	<MRL	0.001		04/10/98
	EPA 245.1	Mercury	mg/L	<MRL	0.0002		04/06/98
	EPA 300.0	Chloride	mg/L	21.9	1.40		04/01/98

Cindy L. Christian

Reported By: Cindy L. Christian
Laboratory Director

NORTHERN TESTING LABORATORIES, INC.

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POUCH 340043 PRUDHOE BAY, ALASKA 99734 (907) 659-2145 • FAX 659-2146

Lab#	Method	Parameter	Units	Results *	MRL	Digest Prepared	Date Analyzed
F177161	EPA 300.0	Fluoride	mg/L	<MRL	0.04		03/31/98
		Nitrate-N	mg/L	0.05	0.03		03/31/98
		Sulfate	mg/L	<MRL	0.20		03/31/98
	SM2120-B	Color, Apparent	Unit	10	5		03/30/98
	SM2150-B	Odor	TON	1	1		03/30/98
	SM2320-B	Alkalinity as CaCO3	mg/L	51	1		04/02/98
		Bicarbonate Alkalinity (as CaCO3)	mg/L	51	1		04/07/98
	SM2330-B	Langelier Index	Unit	-1.6			04/13/98
	SM2540-C	Total Dissolved Solids	mg/L	87	20		03/31/98
	SM4500-CN -E	Total Cyanide	mg/L	<MRL	0.02		04/08/98

Cindy L. Christian

Reported By: Cindy L. Christian
Laboratory Director

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POUCH 340043 PRUDHOE BAY, ALASKA 99734 (907) 659-2145 • FAX 659-2146

Michael Baker, Inc.
4601 Business Park Blvd., Ste. 42
Anchorage, AK 99503

Attn: Jim McGinnis

Report Date: 4/8/98
Date Arrived: 3/31/98
Sample Date: 3/27/98
Sample Time: 10:30
Collected By: L.L.

Client ID: 93-12 (F177161)
Client Project #:
Source:
NTL Lab#: A154707
Sample Matrix: Water
Comments: MBAS received/analyzed beyond recommended holding time

** Legend **

MRL = Method Report Level
MCL = Max. Contaminant Level
B = Present In Method Blank
E = Estimated Value
M = Matrix Interference
H = Above MCL
D = Lost To Dilution

Method	Parameter	Units	Result	MRL	Date Prepared	Date Analyzed
EPA 524.2						
	Benzene	ug/L	<MRL	0.20		4/1/98
	Bromobenzene	ug/L	<MRL	0.20		
	Bromochloromethane	ug/L	<MRL	0.20		
	Bromodichloromethane	ug/L	<MRL	0.20		
	Bromoform	ug/L	<MRL	0.50		
	Bromomethane	ug/L	<MRL	1.00		
	n-Butylbenzene	ug/L	<MRL	0.20		
	sec-Butylbenzene	ug/L	<MRL	0.20		
	tert-Butylbenzene	ug/L	<MRL	0.20		
	Carbon Tetrachloride	ug/L	<MRL	0.20		
	Chlorobenzene	ug/L	<MRL	0.20		
	Chloroethane	ug/L	<MRL	1.00		
	Chloroform	ug/L	<MRL	0.30		
	Chloromethane	ug/L	<MRL	0.50		
	2-Chlorotoluene	ug/L	<MRL	0.20		
	4-Chlorotoluene	ug/L	<MRL	0.20		
	Dibromochloromethane	ug/L	<MRL	0.20		
	Dibromomethane	ug/L	<MRL	0.20		
	1,2-Dichlorobenzene	ug/L	<MRL	0.20		
	1,3-Dichlorobenzene	ug/L	<MRL	0.20		
	1,4-Dichlorobenzene	ug/L	<MRL	0.20		
	Dichlorodifluoromethane	ug/L	<MRL	0.50		
	1,1-Dichloroethane	ug/L	<MRL	0.20		

Reported By: Jorma K. Kuusisto
Chemistry Supervisor

NORTHERN TESTING LABORATORIES, INC.

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Michael Baker, Inc.
4601 Business Park Blvd., Ste. 42
Anchorage, AK 99503

Attn: Jim McGinnis

Report Date: 4/8/98
Date Arrived: 3/31/98
Sample Date: 3/27/98
Sample Time: 10:30
Collected By: L.L.

Client ID: 93-12 (F177161)
Client Project #:
Source:
NTL Lab#: A154707
Sample Matrix: Water
Comments: MBAS received/analyzed beyond recommended holding time

** Legend **
MRL = Method Report Level
MCL = Max. Contaminant Level
B = Present In Method Blank
E = Estimated Value
M = Matrix Interference
H = Above MCL
D = Lost To Dilution

Method	Parameter	Units	Result	MRL	Date Prepared	Date Analyzed
	1,2-Dichloroethane	ug/L	<MRL	0.20		4/1/98
	1,1-Dichloroethene	ug/L	<MRL	0.20		
	cis-1,2-Dichloroethene	ug/L	<MRL	0.20		
	trans-1,2-Dichloroethene	ug/L	<MRL	0.20		
	1,2-Dichloropropane	ug/L	<MRL	0.20		
	1,3-Dichloropropane	ug/L	<MRL	0.20		
	2,2-Dichloropropane	ug/L	<MRL	0.20		
	1,1-Dichloropropene	ug/L	<MRL	0.20		
	cis-1,3-Dichloropropene	ug/L	<MRL	0.20		
	trans-1,3-Dichloropropene	ug/L	<MRL	0.20		
	Ethylbenzene	ug/L	0.28	0.20		
	Hexachlorobutadiene	ug/L	<MRL	0.20		
	Isopropylbenzene	ug/L	<MRL	0.20		
	p-Isopropyltoluene	ug/L	<MRL	0.20		
	Methylene Chloride	ug/L	<MRL	0.50		
	Naphthalene	ug/L	<MRL	0.20		
	n-Propylbenzene	ug/L	<MRL	0.20		
	Styrene	ug/L	<MRL	0.20		
	1,1,1,2-Tetrachloroethane	ug/L	<MRL	0.20		
	1,1,2,2-Tetrachloroethane	ug/L	<MRL	0.20		
	Tetrachloroethene	ug/L	<MRL	0.20		
	Toluene	ug/L	0.83	0.20		
	1,2,3-Trichlorobenzene	ug/L	<MRL	0.20		
	1,2,4-Trichlorobenzene	ug/L	<MRL	0.20		

Reported By: Jorma K. Kuusisto
Chemistry Supervisor

NORTHERN TESTING LABORATORIES, INC.

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Michael Baker, Inc.
4601 Business Park Blvd., Ste. 42
Anchorage, AK 99503

Attn: Jim McGinnis

Client ID: 93-12 (F177161)
Client Project #:
Source:
NTL Lab#: A154707
Sample Matrix: Water
Comments: MBAS received/analyzed beyond recommended holding time

Report Date: 4/8/98
Date Arrived: 3/31/98
Sample Date: 3/27/98
Sample Time: 10:30
Collected By: L.L.

** Legend **
MRL = Method Report Level
MCL = Max. Contaminant Level
B = Present In Method Blank
E = Estimated Value
M = Matrix Interference
H = Above MCL
D = Lost To Dilution

Method	Parameter	Units	Result	MRL	Date Prepared	Date Analyzed
	1,1,1-Trichloroethane	ug/L	<MRL	0.20		4/1/98
	1,1,2-Trichloroethane	ug/L	<MRL	0.20		
	Trichloroethene	ug/L	<MRL	0.20		
	Trichlorofluoromethane	ug/L	<MRL	0.50		
	1,2,3-Trichloropropane	ug/L	<MRL	0.20		
	1,2,4-Trimethylbenzene	ug/L	0.29	0.20		
	1,3,5-Trimethylbenzene	ug/L	0.35	0.20		
	Vinyl Chloride	ug/L	<MRL	0.50		
	m,p-Xylene	ug/L	0.88	0.20		
	o-Xylene	ug/L	0.47	0.20		
	Total Trihalomethanes	ug/L	<MRL	0.50		
	BFB (Surr)	% Recovery	97			
	1,2-DCB-d4 (Surr)	% Recovery	96			
SM 5540 C						
	Foaming Agents (MBAS)	mg/L	<MRL	0.10	4/6/98	4/7/98

Reported By: Jorma K. Kuusisto
Chemistry Supervisor

NORTHERN TESTING LABORATORIES, INC.

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POUCH 340043, PRUDHOE BAY, ALASKA 99734, (907) 659-2145 • FAX 659-2146

DRINKING WATER ANALYSIS REPORT FOR TOTAL COLIFORM BACTERIA

Michael Baker Jr., Inc.
4601 Business Park Blvd.; Ste. 42

Anchorage AK 99503

Date Received: 3/28/98 Time Received: 13:50
Date Analyzed: 3/29/98 Time Analyzed: 14:30
Date Reported: 4/2/98 Time Reported: 09:31
Next Sample Due:

Phone Number:

Fax Number:

Collected by: LL

Sample Type Special Purpose

Method of Analysis: MMO-MUG (SM 9223 B)

Comments: Lounsbury & Associates

Comments
S = Satisfactory
U = Unsatisfactory
POS = Positive Test Result
ND = None Detected
TNTC = Too Numerous To Count (>200 Colonies)
CG = Confluent Growth
HSM = Heavy Sediment Masking, Results May Not Be Reliable
SA = Sample Age >30 Hours But <48 Hours, Results May Not Be Reliable
Old = Sample Age >48 Hours, Too Old For Analysis
R = Resample Required
NT = No Test
* # Colonies/100 ml ** # Colonies/ml

Sample Date	Sample Time	Total* Coliform	E. Coli	Other* Bacteria	HPC** Result	Lab#	Location	Comments
3/27/98	10:30	ND	ND	NT	NT	AK1985	93-12	Satisfactory
3/27/98	15:55	ND	ND	NT	NT	AK1986	93-21	Satisfactory
3/27/98	14:45	ND	ND	NT	NT	AK1987	93-15	Satisfactory
3/27/98	12:00	ND	ND	NT	NT	AK1988	93-10	Satisfactory
3/27/98	15:25	ND	ND	NT	NT	AK1989	93-22	Satisfactory
3/27/98	12:40	ND	ND	NT	NT	AK1990	92-82	Satisfactory
3/27/98	13:15	ND	ND	NT	NT	AK1991	93-13	Satisfactory

Cindy L. Christian Laboratory Director 4/2/98
Northern Testing Laboratories, Inc Fairbanks, AK

NORTHERN TESTING LABORATORIES, INC.

3330 INDUSTRIAL AVENUE FAIRBANKS, ALASKA 99701 (907) 456-3116 • FAX 456-3125
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Michael Baker, Jr. Inc.
4601 Business Park Blvd.; Ste 42
Anchorage AK 99503

Attn: Jim McGinnis, PE

Report Date: 06/10/98

Date Arrived: 03/30/98
Date Sampled: 03/27/98
Time Sampled: 1030
Collected By: LL

MRL = Method Reporting Limit

* Flag Definitions
B = Below Regulatory Min.
H = Above Regulatory Max.

Our Lab #: F177154
Location/Project: Alpine Camp Water System
Your Sample ID: 93-12
Sample Matrix: Water
Comments:

Lab#	Method	Parameter	Units	Results *	MRL	Digest Prepared	Date Analyzed
F177154	EPA 900.0	Gross Alpha	pCi/L	ND@1+/-0.31			05/22/98

Reported By: Cindy L. Christian
Laboratory Director

NORTHERN TESTING LABORATORIES, INC.

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Michael Baker, Jr. Inc.
4601 Business Park Blvd.; Ste 42
Anchorage AK 99503

Attn: Jim McGinnis, PE

Report Date: 04/30/98

Date Arrived: 04/15/98
Date Sampled: 04/12/98
Time Sampled: 1300
Collected By: -

MRL = Method Reporting Limit

* Flag Definitions
B = Below Regulatory Min.
H = Above Regulatory Max.

Our Lab #: F177423
Location/Project: Alpine Camp Water System
Your Sample ID: 93-12
Sample Matrix: Water
Comments:

Lab#	Method	Parameter	Units	Results *	MRL	Digest Prepared	Date Analyzed
F177423	EPA 150.1	pH	Unit	7.9			04/15/98
	EPA 180.1	Turbidity	NTU	0.50	0.05		04/16/98
	EPA 200.7	Aluminum	mg/L	<MRL	0.055		04/29/98
		Barium	mg/L	0.129	0.002		04/29/98
		Beryllium	mg/L	<MRL	0.0005		04/29/98
		Calcium	mg/L	14.5	0.016		04/29/98
		Iron	mg/L	0.099	0.010		04/30/98
		Hardness as CaCO3	mg/L	60.8	0.1		04/29/98
		Magnesium	mg/L	5.94	0.073		04/29/98
		Manganese	mg/L	0.007	0.003		04/29/98
		Sodium	mg/L	9.87	0.120		04/30/98
		Nickel	mg/L	<MRL	0.028		04/29/98
		Zinc	mg/L	0.011	0.008		04/29/98
	EPA 200.9	Silver	mg/L	<MRL	0.0001		04/21/98
		Arsenic	mg/L	<MRL	0.003		04/16/98
		Cadmium	mg/L	<MRL	0.0001		04/17/98
		Chromium	mg/L	<MRL	0.002		04/22/98
		Copper	mg/L	<MRL	0.005		04/27/98
		Antimony	mg/L	<MRL	0.003		04/28/98
		Selenium	mg/L	<MRL	0.003		04/27/98
		Thallium	mg/L	<MRL	0.001		04/23/98
	EPA 245.1	Mercury	mg/L	<MRL	0.0002		04/27/98
	EPA 300.0	Chloride	mg/L	21.1	1.40		04/16/98

Cindy L Christian

Reported By: Cindy L. Christian
Laboratory Director

NORTHERN TESTING LABORATORIES, INC.
3330 INDUSTRIAL AVENUE FAIRBANKS, ALASKA 99701 (907) 456-3116 • FAX 456-3125
8005 SCHOON STREET ANCHORAGE, ALASKA 99518 (907) 349-1000 • FAX 349-1016
POUCH 340043 PRUDHOE BAY, ALASKA 99734 (907) 659-2145 • FAX 659-2146

Lab#	Method	Parameter	Units	Results *	MRL	Digest Prepared	Date Analyzed
F177423	EPA 300.0	Fluoride	mg/L	0.12	0.04		04/15/98
		Nitrate-N	mg/L	<MRL	0.03		04/15/98
		Sulfate	mg/L	<MRL	0.20		04/15/98
	SM2120-B	Color, Apparent	Unit	10	5		04/15/98
	SM2150-B	Odor	TON	2	1		04/15/98
	SM2320-B	Alkalinity as CaCO3	mg/L	60	1		04/15/98
		Bicarbonate Alkalinity (as CaCO3)	mg/L	60	1		04/15/98
	SM2330-B	Langelier Index	Unit	-0.7			04/30/98
	SM2540-C	Total Dissolved Solids	mg/L	85	20		04/17/98
	SM4500-CN -E	Total Cyanide	mg/L	<MRL	0.02		04/16/98

Cindy L Christian

Reported By: Cindy L. Christian
Laboratory Director

NORTHERN TESTING LABORATORIES, INC.

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Michael Baker, Inc.
4601 Business Park Blvd., Ste. 42
Anchorage, AK 99503

Attn: Jim McGinnis

Client ID: 93-12 (F177423)
Client Project #:
Source: AK 2065
NTL Lab#: A154906
Sample Matrix: Water
Comments: MBAS exceeded 48 hour holding time, VOC vials contained head space.

Report Date: 4/28/98
Date Arrived: 4/16/98
Sample Date: 4/12/98
Sample Time: 14:00
Collected By:

** Legend **

MRL = Method Report Level
MCL = Max. Contaminant Level
B = Present In Method Blank
E = Estimated Value
M = Matrix Interference
H = Above MCL
D = Lost To Dilution

Method	Parameter	Units	Result	MRL	Date Prepared	Date Analyzed
EPA 524.2						
	Benzene	ug/L	<MRL	0.20		4/17/98
	Bromobenzene	ug/L	<MRL	0.20		
	Bromochloromethane	ug/L	<MRL	0.20		
	Bromodichloromethane	ug/L	<MRL	0.20		
	Bromoform	ug/L	<MRL	0.50		
	Bromomethane	ug/L	<MRL	1.00		
	n-Butylbenzene	ug/L	<MRL	0.20		
	sec-Butylbenzene	ug/L	<MRL	0.20		
	tert-Butylbenzene	ug/L	<MRL	0.20		
	Carbon Tetrachloride	ug/L	<MRL	0.20		
	Chlorobenzene	ug/L	<MRL	0.20		
	Chloroethane	ug/L	<MRL	1.00		
	Chloroform	ug/L	<MRL	0.30		
	Chloromethane	ug/L	<MRL	0.50		
	2-Chlorotoluene	ug/L	<MRL	0.20		
	4-Chlorotoluene	ug/L	<MRL	0.20		
	Dibromochloromethane	ug/L	<MRL	0.20		
	Dibromomethane	ug/L	<MRL	0.20		
	1,2-Dichlorobenzene	ug/L	<MRL	0.20		
	1,3-Dichlorobenzene	ug/L	<MRL	0.20		
	1,4-Dichlorobenzene	ug/L	<MRL	0.20		
	Dichlorodifluoromethane	ug/L	<MRL	0.50		
	1,1-Dichloroethane	ug/L	<MRL	0.20		

Reported By: Jorma K. Kuusisto
Chemistry Supervisor

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Michael Baker, Inc.
4601 Business Park Blvd., Ste. 42
Anchorage, AK 99503

Attn: Jim McGinnis

Client ID: 93-12 (F177423)
Client Project #:
Source: AK 2065
NTL Lab#: A154906
Sample Matrix: Water
Comments: MBAS exceeded 48 hour holding time, VOC vials contained head space.

Report Date: 4/28/98
Date Arrived: 4/16/98
Sample Date: 4/12/98
Sample Time: 14:00
Collected By:

** Legend **
MRL = Method Report Level
MCL = Max. Contaminant Level
B = Present In Method Blank
E = Estimated Value
M = Matrix Interference
H = Above MCL
D = Lost To Dilution

Method	Parameter	Units	Result	MRL	Date Prepared	Date Analyzed
	1,2-Dichloroethane	ug/L	<MRL	0.20		4/17/98
	1,1-Dichloroethene	ug/L	<MRL	0.20		
	cis-1,2-Dichloroethene	ug/L	<MRL	0.20		
	trans-1,2-Dichloroethene	ug/L	<MRL	0.20		
	1,2-Dichloropropane	ug/L	<MRL	0.20		
	1,3-Dichloropropane	ug/L	<MRL	0.20		
	2,2-Dichloropropane	ug/L	<MRL	0.20		
	1,1-Dichloropropene	ug/L	<MRL	0.20		
	cis-1,3-Dichloropropene	ug/L	<MRL	0.20		
	trans-1,3-Dichloropropene	ug/L	<MRL	0.20		
	Ethylbenzene	ug/L	0.88	0.20		
	Hexachlorobutadiene	ug/L	<MRL	0.20		
	Isopropylbenzene	ug/L	0.26	0.20		
	p-Isopropyltoluene	ug/L	<MRL	0.20		
	Methylene Chloride	ug/L	<MRL	0.50		
	Naphthalene	ug/L	<MRL	0.20		
	n-Propylbenzene	ug/L	0.38	0.20		
	Styrene	ug/L	<MRL	0.20		
	1,1,1,2-Tetrachloroethane	ug/L	<MRL	0.20		
	1,1,2,2-Tetrachloroethane	ug/L	<MRL	0.20		
	Tetrachloroethene	ug/L	<MRL	0.20		
	Toluene	ug/L	2.45	0.20		
	1,2,3-Trichlorobenzene	ug/L	<MRL	0.20		
	1,2,4-Trichlorobenzene	ug/L	<MRL	0.20		

Jorma Kuusisto

Reported By: Jorma K. Kuusisto
Chemistry Supervisor

NORTHERN TESTING LABORATORIES, INC.

3330 INDUSTRIAL AVENUE
8005 SCHOON STREET
POUCH 340043

FAIRBANKS, ALASKA 99701
ANCHORAGE, ALASKA 99518
PRUDHOE BAY, ALASKA 99734

(907) 456-3116 • FAX 456-3125
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(907) 659-2145 • FAX 659-2146

Michael Baker, Inc.
4601 Business Park Blvd., Ste. 42
Anchorage, AK 99503

Attn: Jim McGinnis

Client ID: 93-12 (F177423)
Client Project #:
Source: AK 2065
NTL Lab#: A154906
Sample Matrix: Water
Comments: MBAS exceeded 48 hour holding time, VOC vials contained head space.

Report Date: 4/28/98
Date Arrived: 4/16/98
Sample Date: 4/12/98
Sample Time: 14:00
Collected By:

** Legend **
MRL = Method Report Level
MCL = Max. Contaminant Level
B = Present In Method Blank
E = Estimated Value
M = Matrix Interference
H = Above MCL
D = Lost To Dilution

Method	Parameter	Units	Result	MRL	Date Prepared	Date Analyzed
	1,1,1-Trichloroethane	ug/L	<MRL	0.20		4/17/98
	1,1,2-Trichloroethane	ug/L	<MRL	0.20		
	Trichloroethene	ug/L	<MRL	0.20		
	Trichlorofluoromethane	ug/L	<MRL	0.50		
	1,2,3-Trichloropropane	ug/L	<MRL	0.20		
	1,2,4-Trimethylbenzene	ug/L	0.95	0.20		
	1,3,5-Trimethylbenzene	ug/L	1.12	0.20		
	Vinyl Chloride	ug/L	<MRL	0.50		
	m,p-Xylene	ug/L	3.04	0.20		
	o-Xylene	ug/L	1.56	0.20		
	Total Trihalomethanes	ug/L	<MRL	0.50		
	BFB (Surr)	% Recovery	105			
	1,2-DCB-d4 (Surr)	% Recovery	104			
SM 5540 C						
	Foaming Agents (MBAS)	mg/L	<MRL	0.10	4/17/98	4/17/98

Reported By: Jorma K. Kuusisto
Chemistry Supervisor

NORTHERN TESTING LABORATORIES, INC.

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Michael Baker, Jr. Inc.
4601 Business Park Blvd.; Ste 42
Anchorage AK 99503

Attn: Jim McGinnis, PE

Report Date: 06/10/98

Date Arrived: 04/15/98
Date Sampled: 04/12/98
Time Sampled: 1300
Collected By: -

MRL = Method Reporting Limit

* Flag Definitions
B = Below Regulatory Min.
H = Above Regulatory Max.

Our Lab #: F177430
Location/Project: Alpine Camp Water System
Your Sample ID: 93-12
Sample Matrix: Water
Comments:

Lab#	Method	Parameter	Units	Results *	MRL	Digest Prepared	Date Analyzed
F177430	EPA 900.0	Gross Alpha	pCi/L	ND@1+/-0.32			05/22/98

Reported By: Cindy L. Christian
Laboratory Director

NORTHERN TESTING LABORATORIES, INC.

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Michael Baker, Jr. Inc.
4601 Business Park Blvd.; Ste 42
Anchorage AK 99503

Attn: Jim McGinnis, PE

Report Date: 05/15/98

Date Arrived: 04/29/98
Date Sampled: 04/26/98
Time Sampled: 1410
Collected By: WP

MRL = Method Reporting Limit

* Flag Definitions
B = Below Regulatory Min.
H = Above Regulatory Max.

Our Lab #: F177659
Location/Project: Alpine Camp Water System
Your Sample ID: 93-12
Sample Matrix: Water
Comments:

Lab#	Method	Parameter	Units	Results *	MRL	Digest Prepared	Date Analyzed
F177659	EPA 200.7	Aluminum	mg/L	<MRL	0.055		05/12/98
		Barium	mg/L	0.134	0.002		05/12/98
		Beryllium	mg/L	<MRL	0.0005		05/12/98
		Calcium	mg/L	15.3	0.016		05/12/98
		Copper	mg/L	0.008	0.008		05/12/98
		Iron	mg/L	0.247	0.010		05/12/98
		Hardness as CaCO3	mg/L	63.7	0.1		05/12/98
		Magnesium	mg/L	6.2	0.073		05/12/98
		Manganese	mg/L	0.047	0.003		05/13/98
		Sodium	mg/L	9.88	0.120		05/12/98
		Nickel	mg/L	<MRL	0.028		05/12/98
		Zinc	mg/L	<MRL	0.008		05/12/98
	EPA 200.9	Silver	mg/L	<MRL	0.0001		05/07/98
		Arsenic	mg/L	<MRL	0.003		05/08/98
		Cadmium	mg/L	<MRL	0.0001		04/30/98
		Chromium	mg/L	<MRL	0.002		05/08/98
		Antimony	mg/L	<MRL	0.003		05/13/98
		Selenium	mg/L	<MRL	0.003		04/30/98
		Thallium	mg/L	<MRL	0.001		05/14/98
	EPA 245.1	Mercury	mg/L	<MRL	0.0002		05/06/98
	EPA 300.0	Chloride	mg/L	18.1	0.70		05/12/98
		Fluoride	mg/L	0.05	0.04		05/05/98
		Nitrate-N	mg/L	<MRL	0.03		05/02/98
		Sulfate	mg/L	0.46	0.20		05/05/98

Cindy L. Christian

Reported By: Cindy L. Christian
Laboratory Director

NORTHERN TESTING LABORATORIES, INC.

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Lab#	Method	Parameter	Units	Results *	MRL	Digest Prepared	Date Analyzed
F177659	SM2120-B	Color, Apparent	Unit	10	5		04/29/98
	SM2130-B	Turbidity	NTU	1.4	0.05		04/29/98
	SM2150-B	Odor	TON	8 H	1		04/29/98
	SM2320-B	Alkalinity as CaCO3	mg/L	62	5		05/01/98
		Bicarbonate Alkalinity (as CaCO3)	mg/L	62	1		05/01/98
	SM2330-B	Langelier Index	Unit	-1.6			05/14/98
	SM2540-C	Total Dissolved Solids	mg/L	108	1		04/30/98
	SM4500-CN -E	Total Cyanide	mg/L	<MRL	0.02		05/06/98
	SM4500-H- B	pH	Unit	7.0			04/29/98

Cindy L Christian

Reported By: Cindy L. Christian
Laboratory Director

NORTHERN TESTING LABORATORIES, INC.

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Michael Baker, Inc.
4601 Business Park Blvd., Ste. 42
Anchorage, AK 99503

Attn: Jim McGinnis

Client ID: 93-12
Client Project #:
Source:
NTL Lab#: A155017
Sample Matrix: Water
Comments: F177659 Sample received/analyzed beyond MBAS holding time

Report Date: 5/6/98
Date Arrived: 4/30/98
Sample Date: 4/26/98
Sample Time: 14:10
Collected By: WP

** Legend **
MRL = Method Report Level
MCL = Max. Contaminant Level
B = Present In Method Blank
E = Estimated Value
M = Matrix Interference
H = Above MCL
D = Lost To Dilution

Method	Parameter	Units	Result	MRL	Date Prepared	Date Analyzed
EPA 524.2						
	Benzene	ug/L	<MRL	0.20		5/1/98
	Bromobenzene	ug/L	<MRL	0.20		
	Bromochloromethane	ug/L	<MRL	0.20		
	Bromodichloromethane	ug/L	<MRL	0.20		
	Bromoform	ug/L	<MRL	0.50		
	Bromomethane	ug/L	<MRL	1.00		
	n-Butylbenzene	ug/L	<MRL	0.20		
	sec-Butylbenzene	ug/L	<MRL	0.20		
	tert-Butylbenzene	ug/L	<MRL	0.20		
	Carbon Tetrachloride	ug/L	<MRL	0.20		
	Chlorobenzene	ug/L	<MRL	0.20		
	Chloroethane	ug/L	<MRL	1.00		
	Chloroform	ug/L	<MRL	0.30		
	Chloromethane	ug/L	<MRL	0.50		
	2-Chlorotoluene	ug/L	<MRL	0.20		
	4-Chlorotoluene	ug/L	<MRL	0.20		
	Dibromochloromethane	ug/L	<MRL	0.20		
	Dibromomethane	ug/L	<MRL	0.20		
	1,2-Dichlorobenzene	ug/L	<MRL	0.20		
	1,3-Dichlorobenzene	ug/L	<MRL	0.20		
	1,4-Dichlorobenzene	ug/L	<MRL	0.20		
	Dichlorodifluoromethane	ug/L	<MRL	0.50		
	1,1-Dichloroethane	ug/L	<MRL	0.20		

Reported By: Jorma K. Kuusisto
Chemistry Supervisor

NORTHERN TESTING LABORATORIES, INC.

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Michael Baker, Inc.
4601 Business Park Blvd., Ste. 42
Anchorage, AK 99503

Attn: Jim McGinnis

Report Date: 5/6/98
Date Arrived: 4/30/98
Sample Date: 4/26/98
Sample Time: 14:10
Collected By: WP

Client ID: 93-12
Client Project #:
Source:
NTL Lab#: A155017
Sample Matrix: Water
Comments: F177659 Sample received/analyzed beyond MBAS holding time

** Legend **
MRL = Method Report Level
MCL = Max. Contaminant Level
B = Present In Method Blank
E = Estimated Value
M = Matrix Interference
H = Above MCL
D = Lost To Dilution

Method	Parameter	Units	Result	MRL	Date Prepared	Date Analyzed
	1,2-Dichloroethane	ug/L	<MRL	0.20		5/1/98
	1,1-Dichloroethene	ug/L	<MRL	0.20		
	cis-1,2-Dichloroethene	ug/L	<MRL	0.20		
	trans-1,2-Dichloroethene	ug/L	<MRL	0.20		
	1,2-Dichloropropane	ug/L	<MRL	0.20		
	1,3-Dichloropropane	ug/L	<MRL	0.20		
	2,2-Dichloropropane	ug/L	<MRL	0.20		
	1,1-Dichloropropene	ug/L	<MRL	0.20		
	cis-1,3-Dichloropropene	ug/L	<MRL	0.20		
	trans-1,3-Dichloropropene	ug/L	<MRL	0.20		
	Ethylbenzene	ug/L	<MRL	0.20		
	Hexachlorobutadiene	ug/L	<MRL	0.20		
	Isopropylbenzene	ug/L	<MRL	0.20		
	p-Isopropyltoluene	ug/L	<MRL	0.20		
	Methylene Chloride	ug/L	<MRL	0.50		
	Naphthalene	ug/L	<MRL	0.20		
	n-Propylbenzene	ug/L	<MRL	0.20		
	Styrene	ug/L	<MRL	0.20		
	1,1,1,2-Tetrachloroethane	ug/L	<MRL	0.20		
	1,1,2,2-Tetrachloroethane	ug/L	<MRL	0.20		
	Tetrachloroethene	ug/L	<MRL	0.20		
	Toluene	ug/L	<MRL	0.20		
	1,2,3-Trichlorobenzene	ug/L	<MRL	0.20		
	1,2,4-Trichlorobenzene	ug/L	<MRL	0.20		

Reported By: Jorma K. Kuusisto
Chemistry Supervisor

NORTHERN TESTING LABORATORIES, INC.

3330 INDUSTRIAL AVENUE — FAIRBANKS, ALASKA 99701 — (907) 456-3116 • FAX 456-3125
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Michael Baker, Inc.
4601 Business Park Blvd., Ste. 42
Anchorage, AK 99503

Attn: Jim McGinnis

Client ID: 93-12
Client Project #:
Source:
NTL Lab#: A155017
Sample Matrix: Water
Comments: F177659 Sample received/analyzed beyond MBAS holding time

Report Date: 5/6/98
Date Arrived: 4/30/98
Sample Date: 4/26/98
Sample Time: 14:10
Collected By: WP

** Legend **
MRL = Method Report Level
MCL = Max. Contaminant Level
B = Present In Method Blank
E = Estimated Value
M = Matrix Interference
H = Above MCL
D = Lost To Dilution

Method	Parameter	Units	Result	MRL	Date Prepared	Date Analyzed
	1,1,1-Trichloroethane	ug/L	<MRL	0.20		5/1/98
	1,1,2-Trichloroethane	ug/L	<MRL	0.20		
	Trichloroethene	ug/L	<MRL	0.20		
	Trichlorofluoromethane	ug/L	<MRL	0.50		
	1,2,3-Trichloropropane	ug/L	<MRL	0.20		
	1,2,4-Trimethylbenzene	ug/L	<MRL	0.20		
	1,3,5-Trimethylbenzene	ug/L	<MRL	0.20		
	Vinyl Chloride	ug/L	<MRL	0.50		
	m,p-Xylene	ug/L	<MRL	0.20		
	o-Xylene	ug/L	<MRL	0.20		
	Total Trihalomethanes	ug/L	<MRL	0.50		
	BFB (Surr)	% Recovery	73			
	1,2-Dichlorobenzene-d4	% Recovery	70			
SM 5540 C						
	Foaming Agents (MBAS)	mg/L	<MRL	0.10		5/4/98

Reported By: Jorma K. Kuusisto
Chemistry Supervisor

NORTHERN TESTING LABORATORIES, INC.

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DRINKING WATER ANALYSIS REPORT FOR TOTAL COLIFORM BACTERIA

Michael Baker Jr., Inc.
4601 Business Park Blvd.; Ste. 42

Anchorage AK 99503

Date Received: 4/27/98 Time Received: 17:30
Date Analyzed: 4/28/98 Time Analyzed: 18:00
Date Reported: 5/1/98 Time Reported: 11:14
Next Sample Due:

Phone Number:

Fax Number:

Collected by: WP

Sample Type Special Purpose

Method of Analysis: MMO-MUG (SM 9223 B)

Comments:

Comments
S = Satisfactory
U = Unsatisfactory
POS = Positive Test Result
ND = None Detected
TNTC = Too Numerous To Count (>200 Colonies)
CG = Confluent Growth
HSM = Heavy Sediment Masking, Results May Not Be Reliable
SA = Sample Age >30 Hours But <48 Hours, Results May Not Be Reliable
Old = Sample Age >48 Hours, Too Old For Analysis
R = Resample Required
NT = No Test

* # Colonies/100 ml ** # Colonies/ml

Sample Date	Sample Time	Total* Coliform	E. Coli	Other* Bacteria	HPC** Result	Lab#	Location	Comments
4/26/98	13:40	ND	ND	NT	NT	AK2189	93-13	Satisfactory
4/26/98	14:40	ND	ND	NT	NT	AK2190	93-10	Satisfactory
4/26/98	11:46	ND	ND	NT	NT	AK2191	93-15	Satisfactory
4/26/98	14:10	ND	ND	NT	NT	AK2192	93-12	Satisfactory
4/26/98	12:36	ND	ND	NT	NT	AK2193	93-21	Satisfactory
4/26/98	13:00	ND	ND	NT	NT	AK2194	93-22	Satisfactory
4/26/98	15:10	ND	ND	NT	NT	AK2195	92-82	Satisfactory

Marian Ruth

Marian Ruth Environmental Analyst 5/1/98
Northern Testing Laboratories, Inc Fairbanks, AK

NORTHERN TESTING LABORATORIES, INC.

3330 INDUSTRIAL AVENUE FAIRBANKS, ALASKA 99701 (907) 456-3116 • FAX 456-3125
8005 SCHOON STREET ANCHORAGE, ALASKA 99518 (907) 349-1000 • FAX 349-1016
POUCH 340043 PRUDHOE BAY, ALASKA 99734 (907) 659-2145 • FAX 659-2146

Michael Baker, Jr. Inc.
4601 Business Park Blvd.; Ste 42
Anchorage AK 99503

Attn: Jim McGinnis, PE

Report Date: 06/10/98

Date Arrived: 04/29/98
Date Sampled: 04/26/98
Time Sampled: 1410
Collected By: WP

MRL = Method Reporting Limit

* Flag Definitions
B = Below Regulatory Min.
H = Above Regulatory Max.

Our Lab #: F177666
Location/Project: Alpine Camp Water System
Your Sample ID: 93-12
Sample Matrix: Water
Comments:

Lab#	Method	Parameter	Units	Results *	MRL	Digest Prepared	Date Analyzed
F177666	EPA 900.0	Gross Alpha	pCi/L	ND@1+/-0.33			05/28/98

Cindy L Christian

Reported By: Cindy L. Christian
Laboratory Director

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Michael Baker, Jr. Inc.
4601 Business Park Blvd.; Ste 42
Anchorage AK 99503

Attn: Jim McGinnis, PE

Report Date: 05/29/98

Date Arrived: 05/14/98
Date Sampled: 05/11/98
Time Sampled: 1520
Collected By: -

MRL = Method Reporting Limit

* Flag Definitions
B = Below Regulatory Min.
H = Above Regulatory Max.

Our Lab #: F178039
Location/Project: Alpine Camp Water System
Your Sample ID: 93-12
Sample Matrix: Water
Comments:

Lab#	Method	Parameter	Units	Results	*	MRL	Digest Prepared	Date Analyzed
F178039	EPA 200.7	Aluminum	mg/L	<MRL		0.055		05/19/98
		Barium	mg/L	0.126		0.002		05/19/98
		Beryllium	mg/L	<MRL		0.0005		05/19/98
		Calcium	mg/L	14.5		0.016		05/19/98
		Copper	mg/L	<MRL		0.008		05/19/98
		Iron	mg/L	0.064		0.010		05/19/98
		Hardness as CaCO3	mg/L	60.2		0.1		05/19/98
		Magnesium	mg/L	5.83		0.073		05/19/98
		Manganese	mg/L	0.019		0.003		05/19/98
		Sodium	mg/L	9.78		0.120		05/19/98
		Nickel	mg/L	<MRL		0.028		05/19/98
		Zinc	mg/L	<MRL		0.008		05/19/98
	EPA 200.9	Silver	mg/L	<MRL		0.0001		05/27/98
		Arsenic	mg/L	<MRL		0.003		05/18/98
		Cadmium	mg/L	0.0001		0.0001		05/22/98
		Chromium	mg/L	<MRL		0.002		05/27/98
		Antimony	mg/L	<MRL		0.003		05/27/98
		Selenium	mg/L	<MRL		0.003		05/20/98
		Thallium	mg/L	<MRL		0.001		05/15/98
	EPA 245.1	Mercury	mg/L	<MRL		0.0002		05/19/98
	EPA 300.0	Chloride	mg/L	17		0.35		05/19/98
		Fluoride	mg/L	0.06		0.04		05/14/98
		Nitrate-N	mg/L	<MRL		0.03		05/14/98
		Sulfate	mg/L	0.25		0.20		05/14/98

Cindy L. Christian

Reported By: Cindy L. Christian
Laboratory Director

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Lab#	Method	Parameter	Units	Results *	MRL	Digest Prepared	Date Analyzed
F178039	SM2120-B	Color, Apparent	Unit	10	5		05/14/98
	SM2130-B	Turbidity	NTU	0.45	0.05		05/14/98
	SM2150-B	Odor	TON	2	1		05/14/98
	SM2320-B	Alkalinity as CaCO3	mg/L	57	5		05/14/98
		Bicarbonate Alkalinity (as CaCO3)	mg/L	57	1		05/14/98
	SM2330-B	Langelier Index	Unit	-0.8			05/22/98
	SM2540-C	Total Dissolved Solids	mg/L	85	25		05/19/98
	SM4500-CN -E	Total Cyanide	mg/L	<MRL	0.02		05/18/98
	SM4500-H-B	pH	Unit	7.8			05/14/98

Reported By: Cindy L. Christian
Laboratory Director

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Michael Baker, Inc.
4601 Business Park Blvd., Ste. 42
Anchorage, AK 99503

Attn: Jim McGinnis

Client ID: 93-12 (F178039)
Client Project #: 2271
Source:
NTL Lab#: A155281
Sample Matrix: Water
Comments:

Report Date: 5/29/98
Date Arrived: 5/15/98
Sample Date: 5/11/98
Sample Time: 15:20
Collected By:

** Legend **

MRL = Method Report Level
MCL = Max. Contaminant Level
B = Present In Method Blank
E = Estimated Value
M = Matrix Interference
H = Above MCL
D = Lost To Dilution

Method	Parameter	Units	Result	MRL	Date Prepared	Date Analyzed
EPA 524.2						
	Benzene	ug/L	<MRL	0.20		5/21/98
	Bromobenzene	ug/L	<MRL	0.20		
	Bromochloromethane	ug/L	<MRL	0.20		
	Bromodichloromethane	ug/L	<MRL	0.20		
	Bromoform	ug/L	<MRL	0.50		
	Bromomethane	ug/L	<MRL	1.00		
	n-Butylbenzene	ug/L	<MRL	0.20		
	sec-Butylbenzene	ug/L	<MRL	0.20		
	tert-Butylbenzene	ug/L	<MRL	0.20		
	Carbon Tetrachloride	ug/L	<MRL	0.20		
	Chlorobenzene	ug/L	<MRL	0.20		
	Chloroethane	ug/L	<MRL	1.00		
	Chloroform	ug/L	<MRL	0.30		
	Chloromethane	ug/L	<MRL	0.50		
	2-Chlorotoluene	ug/L	<MRL	0.20		
	4-Chlorotoluene	ug/L	<MRL	0.20		
	Dibromochloromethane	ug/L	<MRL	0.20		
	Dibromomethane	ug/L	<MRL	0.20		
	1,2-Dichlorobenzene	ug/L	<MRL	0.20		
	1,3-Dichlorobenzene	ug/L	<MRL	0.20		
	1,4-Dichlorobenzene	ug/L	<MRL	0.20		
	Dichlorodifluoromethane	ug/L	<MRL	0.50		
	1,1-Dichloroethane	ug/L	<MRL	0.20		

Reported By: Jorma K. Kuusisto
Chemistry Supervisor

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Michael Baker, Inc.
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Attn: Jim McGinnis

Client ID: 93-12 (F178039)
Client Project #: 2271
Source:
NTL Lab#: A155281
Sample Matrix: Water
Comments:

Report Date: 5/29/98
Date Arrived: 5/15/98
Sample Date: 5/11/98
Sample Time: 15:20
Collected By:

** Legend **

MRL = Method Report Level
MCL = Max. Contaminant Level
B = Present In Method Blank
E = Estimated Value
M = Matrix Interference
H = Above MCL
D = Lost To Dilution

Method	Parameter	Units	Result	MRL	Date Prepared	Date Analyzed
	1,2-Dichloroethane	ug/L	<MRL	0.20		5/21/98
	1,1-Dichloroethene	ug/L	<MRL	0.20		
	cis-1,2-Dichloroethene	ug/L	<MRL	0.20		
	trans-1,2-Dichloroethene	ug/L	<MRL	0.20		
	1,2-Dichloropropane	ug/L	<MRL	0.20		
	1,3-Dichloropropane	ug/L	<MRL	0.20		
	2,2-Dichloropropane	ug/L	<MRL	0.20		
	1,1-Dichloropropene	ug/L	<MRL	0.20		
	cis-1,3-Dichloropropene	ug/L	<MRL	0.20		
	trans-1,3-Dichloropropene	ug/L	<MRL	0.20		
	Ethylbenzene	ug/L	<MRL	0.20		
	Hexachlorobutadiene	ug/L	<MRL	0.20		
	Isopropylbenzene	ug/L	<MRL	0.20		
	p-Isopropyltoluene	ug/L	<MRL	0.20		
	Methylene Chloride	ug/L	<MRL	0.50		
	Naphthalene	ug/L	<MRL	0.20		
	n-Propylbenzene	ug/L	<MRL	0.20		
	Styrene	ug/L	<MRL	0.20		
	1,1,1,2-Tetrachloroethane	ug/L	<MRL	0.20		
	1,1,2,2-Tetrachloroethane	ug/L	<MRL	0.20		
	Tetrachloroethene	ug/L	<MRL	0.20		
	Toluene	ug/L	<MRL	0.20		
	1,2,3-Trichlorobenzene	ug/L	<MRL	0.20		
	1,2,4-Trichlorobenzene	ug/L	<MRL	0.20		

Reported By: Jorma K. Kuusisto
Chemistry Supervisor

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Michael Baker, Inc.
4601 Business Park Blvd., Ste. 42
Anchorage, AK 99503

Attn: Jim McGinnis

Client ID: 93-12 (F178039)
Client Project #: 2271
Source:
NTL Lab#: A155281
Sample Matrix: Water
Comments:

Report Date: 5/29/98
Date Arrived: 5/15/98
Sample Date: 5/11/98
Sample Time: 15:20
Collected By:

** Legend **
MRL = Method Report Level
MCL = Max. Contaminant Level
B = Present In Method Blank
E = Estimated Value
M = Matrix Interference
H = Above MCL
D = Lost To Dilution

Method	Parameter	Units	Result	MRL	Date Prepared	Date Analyzed
	1,1,1-Trichloroethane	ug/L	<MRL	0.20		5/21/98
	1,1,2-Trichloroethane	ug/L	<MRL	0.20		
	Trichloroethene	ug/L	<MRL	0.20		
	Trichlorofluoromethane	ug/L	<MRL	0.50		
	1,2,3-Trichloropropane	ug/L	<MRL	0.20		
	1,2,4-Trimethylbenzene	ug/L	<MRL	0.20		
	1,3,5-Trimethylbenzene	ug/L	<MRL	0.20		
	Vinyl Chloride	ug/L	<MRL	0.50		
	m,p-Xylene	ug/L	<MRL	0.20		
	o-Xylene	ug/L	<MRL	0.20		
	Total Trihalomethanes	ug/L	<MRL	0.50		
	4-Bromofluorobenzene	% Recovery	84			
	1,2-Dichlorobenzene-d4	% Recovery	78			
SM 5540 C						
	Foaming Agents (MBAS)	mg/L	<MRL	0.10		5/28/98

Reported By: Jorma K. Kuusisto
Chemistry Supervisor

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Report Date: 14 May 98 Report No.: 98050015

Report of Analysis

Northern Testing Laboratories
3330 Industrial Avenue
Fairbanks, AK 99701
(907)456-3116

Field ID Number	93-12
Sample Description	Lake Sampling
Date/Time Sampled	05/11/98 @15:20
Date/Time Received	05/12/98 @14:56 by JEP
NTL Lab Number	NT03221

Analyte	Result	Units	MDL	Method	Preparation Date	Analysis Date	Analyst
Total Coliform by Colilert	Not detected	CFU/100ml		SM 9223B	05/13/98	05/14/98	JEP

Approved by: Jerry Pollen

Don Cook / Jerry Pollen
Chemist / Lab Tech

NORTHERN TESTING LABORATORIES, INC.
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Michael Baker, Jr. Inc.
4601 Business Park Blvd.; Ste 42
Anchorage AK 99503

Attn: Jim McGinnis, PE

Report Date: 07/22/98

Date Arrived: 05/14/98
Date Sampled: 05/11/98
Time Sampled: 1520
Collected By: -

MRL = Method Reporting Limit

* Flag Definitions
B = Below Regulatory Min.
H = Above Regulatory Max.

Our Lab #: F178046
Location/Project: Alpine Camp Water System
Your Sample ID: 93-12
Sample Matrix: Water
Comments:

Lab#	Method	Parameter	Units	Results *	MRL	Digest Prepared	Date Analyzed
F178046	EPA 900.0	Gross Alpha	pCi/L	ND@1+/-0.26			07/08/98

Reported By: Cindy L. Christian
Laboratory Director

NORTHERN TESTING LABORATORIES, INC.
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Michael Baker, Jr. Inc.
4601 Business Park Blvd.; Ste 42
Anchorage AK 99503

Attn: Jim McGinnis, PE

Report Date: 07/22/98

Date Arrived: 05/28/98
Date Sampled: 05/26/98
Time Sampled: 1540
Collected By: -

MRL = Method Reporting Limit

* Flag Definitions
B = Below Regulatory Min.
H = Above Regulatory Max.

Our Lab #: F178234
Location/Project: Alpine Camp Water System
Your Sample ID: L93-12
Sample Matrix: Water
Comments:

Lab#	Method	Parameter	Units	Results *	MRL	Digest Prepared	Date Analyzed
F178234	EPA 900.0	Gross Alpha	pCi/L	ND@1+/-0.38			07/08/98

Reported By: Cindy L. Christian
Laboratory Director

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Michael Baker, Jr. Inc.
4601 Business Park Blvd.; Ste 42
Anchorage AK 99503

Attn: Jim McGinnis, PE

Report Date: 07/22/98

Date Arrived: 06/11/98
Date Sampled: 06/09/98
Time Sampled: 0910
Collected By: DAD/KHE

MRL = Method Reporting Limit

* Flag Definitions
B = Below Regulatory Min.
H = Above Regulatory Max.

Our Lab #: F178542
Location/Project: Alpine Camp Water System
Your Sample ID: 93-12
Sample Matrix: Water
Comments:

Lab#	Method	Parameter	Units	Results *	MRL	Digest Prepared	Date Analyzed
F178542	EPA 900.0	Gross Alpha	pCi/L	ND@1+/-0.32			07/08/98

Reported By: Cindy L. Christian
Laboratory Director

1998 Lake 93-13 Data

NORTHERN TESTING LABORATORIES, INC.
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Michael Baker, Jr. Inc.
4601 Business Park Blvd.; Ste 42
Anchorage AK 99503

Attn: Jim McGinnis, PE

Report Date: 03/09/98

Date Arrived: 02/04/98
Date Sampled: 02/01/98
Time Sampled: -
Collected By: -

MDL = Method Detection Limit

Our Lab #: F176284
Location/Project: Alpine Camp Water System
Your Sample ID: 93-13
Sample Matrix: Water
Comments:

* Flag Definitions
B = Below Regulatory Min.
H = Above Regulatory Max.

Lab#	Method	Parameter	Units	Results *	MDL	Date Prepared	Date Analyzed
F176284	EPA 150.1	pH	Unit	7.0			02/04/98
	EPA 180.1	Turbidity	NTU	0.85	0.05		02/04/98
	EPA 200.7	Aluminum	mg/L	<MDL	0.055		02/13/98
		Barium	mg/L	0.149	0.002		02/13/98
		Beryllium	mg/L	<MDL	0.0005		02/13/98
		Calcium	mg/L	15.8	0.016		02/09/98
		Iron	mg/L	0.091	0.010		02/12/98
		Hardness as CaCO3	mg/L	65.4	0.1		03/06/98
		Magnesium	mg/L	6.32	0.073		03/06/98
		Manganese	mg/L	0.377 H	0.003		02/13/98
		Sodium	mg/L	18.6	0.120		02/18/98
		Nickel	mg/L	<MDL	0.028		02/11/98
		Zinc	mg/L	<MDL	0.008		02/13/98
	EPA 200.9	Silver	mg/L	<MDL	0.0001		02/17/98
		Arsenic	mg/L	<MDL	0.003		02/09/98
		Cadmium	mg/L	<MDL	0.0001		02/11/98
		Chromium	mg/L	<MDL	0.002		02/11/98
		Copper	mg/L	<MDL	0.050		02/10/98
		Antimony	mg/L	<MDL	0.003		02/12/98
		Selenium	mg/L	<MDL	0.003		02/18/98
		Thallium	mg/L	<MDL	0.001		02/13/98
	EPA 245.1	Mercury	mg/L	<MDL	0.0002		02/16/98
	EPA 300.0	Chloride	mg/L	34.2	2.00		02/09/98

Cindy L. Christian

Reported By: Cindy L. Christian
Laboratory Director

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Lab#	Method	Parameter	Units	Results *	MDL	Date Prepared	Date Analyzed
F176284	EPA 300.0	Fluoride	mg/L	0.05	0.04		02/04/98
		Nitrate-N	mg/L	<MDL	0.03		02/04/98
		Sulfate	mg/L	1.64	0.20		02/04/98
	SM2120-B	Color, Apparent	Unit	20 H	5		02/04/98
	SM2150-B	Odor	TON	4 H	1		02/04/98
	SM2320-B	Alkalinity as CaCO3	mg/L	56	1		02/11/98
		Bicarbonate Alkalinity (as CaCO3)	mg/L	56	1		02/11/98
	SM2330-B	Langelier Index	Unit	-1.6			02/20/98
	SM2540-C	Total Dissolved Solids	mg/L	100	20		02/17/98
	SM4500-CN -E	Total Cyanide	mg/L	<MDL	0.02		02/11/98

Cindy L. Christian

Reported By: Cindy L. Christian
Laboratory Director

NORTHERN TESTING LABORATORIES, INC.

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Michael Baker, Jr., Inc.
4601 Business Park Blvd., Ste. 42
Anchorage, AK 99503

Attn: Jim McGinnis, P.E.

Client ID: 93-13
Client Project #:
Source: Alpine Camp Water System
NTL Lab#: A154121
Sample Matrix: Water
Comments:

Report Date: 2/20/98
Date Arrived: 2/5/98
Sample Date: 2/1/98
Sample Time:
Collected By:

** Legend **
MRL = Method Report Level
MCL = Max. Contaminant Level
B = Present In Method Blank
E = Estimated Value
M = Matrix Interference
H = Above MCL
D = Lost To Dilution

Method	Parameter	Units	Result	MRL	Date Prepared	Date Analyzed
EPA 524.2						
	Benzene	ug/L	0.27	0.20		2/12/98
	Bromobenzene	ug/L	<MRL	0.20		
	Bromochloromethane	ug/L	<MRL	0.20		
	Bromodichloromethane	ug/L	<MRL	0.20		
	Bromoform	ug/L	<MRL	0.50		
	Bromomethane	ug/L	<MRL	1.00		
	n-Butylbenzene	ug/L	<MRL	0.20		
	sec-Butylbenzene	ug/L	<MRL	0.20		
	tert-Butylbenzene	ug/L	<MRL	0.20		
	Carbon Tetrachloride	ug/L	<MRL	0.20		
	Chlorobenzene	ug/L	<MRL	0.20		
	Chloroethane	ug/L	<MRL	1.00		
	Chloroform	ug/L	<MRL	0.30		
	Chloromethane	ug/L	<MRL	0.50		
	2-Chlorotoluene	ug/L	<MRL	0.20		
	4-Chlorotoluene	ug/L	<MRL	0.20		
	Dibromochloromethane	ug/L	<MRL	0.20		
	Dibromomethane	ug/L	<MRL	0.20		
	1,2-Dichlorobenzene	ug/L	<MRL	0.20		
	1,3-Dichlorobenzene	ug/L	<MRL	0.20		
	1,4-Dichlorobenzene	ug/L	<MRL	0.20		
	Dichlorodifluoromethane	ug/L	<MRL	0.50		
	1,1-Dichloroethane	ug/L	<MRL	0.20		

Reported By: Jorma K. Kuusisto
Chemistry Supervisor

NORTHERN TESTING LABORATORIES, INC.

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Michael Baker, Jr., Inc.
4601 Business Park Blvd., Ste. 42
Anchorage, AK 99503

Attn: Jim McGinnis, P.E.

Client ID: 93-13
Client Project #:
Source: Alpine Camp Water System
NTL Lab#: A154121
Sample Matrix: Water
Comments:

Report Date: 2/20/98
Date Arrived: 2/5/98
Sample Date: 2/1/98
Sample Time:
Collected By:

** Legend **
MRL = Method Report Level
MCL = Max. Contaminant Level
B = Present In Method Blank
E = Estimated Value
M = Matrix Interference
H = Above MCL
D = Lost To Dilution

Method	Parameter	Units	Result	MRL	Date Prepared	Date Analyzed
	1,2-Dichloroethane	ug/L	<MRL	0.20		2/12/98
	1,1-Dichloroethene	ug/L	<MRL	0.20		
	cis-1,2-Dichloroethene	ug/L	<MRL	0.20		
	trans-1,2-Dichloroethene	ug/L	<MRL	0.20		
	1,2-Dichloropropane	ug/L	<MRL	0.20		
	1,3-Dichloropropane	ug/L	<MRL	0.20		
	2,2-Dichloropropane	ug/L	<MRL	0.20		
	1,1-Dichloropropene	ug/L	<MRL	0.20		
	cis-1,3-Dichloropropene	ug/L	<MRL	0.20		
	trans-1,3-Dichloropropene	ug/L	<MRL	0.20		
	Ethylbenzene	ug/L	<MRL	0.20		
	Hexachlorobutadiene	ug/L	<MRL	0.20		
	Isopropylbenzene	ug/L	<MRL	0.20		
	p-Isopropyltoluene	ug/L	<MRL	0.20		
	Methylene Chloride	ug/L	<MRL	0.50		
	Naphthalene	ug/L	<MRL	0.20		
	n-Propylbenzene	ug/L	<MRL	0.20		
	Styrene	ug/L	<MRL	0.20		
	1,1,1,2-Tetrachloroethane	ug/L	<MRL	0.20		
	1,1,2,2-Tetrachloroethane	ug/L	<MRL	0.20		
	Tetrachloroethene	ug/L	<MRL	0.20		
	Toluene	ug/L	1.42	0.20		
	1,2,3-Trichlorobenzene	ug/L	<MRL	0.20		
	1,2,4-Trichlorobenzene	ug/L	<MRL	0.20		

Reported By: Jorma K. Kuusisto
Chemistry Supervisor

NORTHERN TESTING LABORATORIES, INC.

3330 INDUSTRIAL AVENUE
8005 SCHOON STREET

FAIRBANKS, ALASKA 99701
ANCHORAGE, ALASKA 99518

(907) 456-3116 • FAX 456-3125
(907) 349-1000 • FAX 349-1016

Michael Baker, Jr., Inc.
4601 Business Park Blvd., Ste. 42
Anchorage, AK 99503

Attn: Jim McGinnis, P.E.

Client ID: 93-13
Client Project #:
Source: Alpine Camp Water System
NTL Lab#: A154121
Sample Matrix: Water
Comments:

Report Date: 2/20/98
Date Arrived: 2/5/98
Sample Date: 2/1/98
Sample Time:
Collected By:

** Legend **

MRL = Method Report Level
MCL = Max. Contaminant Level
B = Present In Method Blank
E = Estimated Value
M = Matrix Interference
H = Above MCL
D = Lost To Dilution

Method	Parameter	Units	Result	MRL	Date Prepared	Date Analyzed
	1,1,1-Trichloroethane	ug/L	<MRL	0.20		2/12/98
	1,1,2-Trichloroethane	ug/L	<MRL	0.20		
	Trichloroethene	ug/L	<MRL	0.20		
	Trichlorofluoromethane	ug/L	<MRL	0.50		
	1,2,3-Trichloropropane	ug/L	<MRL	0.20		
	1,2,4-Trimethylbenzene	ug/L	0.21	0.20		
	1,3,5-Trimethylbenzene	ug/L	0.21	0.20		
	Vinyl Chloride	ug/L	<MRL	0.50		
	p,m-Xylene	ug/L	0.63	0.20		
	o-Xylene	ug/L	<MRL	0.20		
	Total Xylenes	ug/L	<MRL	0.20		
	Total Trihalomethanes	ug/L	<MRL	0.50		
	BFB (Surr)	% Recovery	100			
	1,2-DCB-d4 (Surr)	% Recovery	100			
SM 5540 C						
	Foaming Agents	mg/L	<MRL	0.10	2/6/98	2/7/98

Reported By: Jorma K. Kuusisto
Chemistry Supervisor

NORTHERN TESTING LABORATORIES, INC.

3330 INDUSTRIAL AVENUE FAIRBANKS, ALASKA 99701 (907) 456-3116 • FAX 456-3125
8005 SCHOON STREET ANCHORAGE, ALASKA 99518 (907) 349-1000 • FAX 349-1016

Michael Baker, Jr., Inc.
4601 Business Park Blvd., Ste. 42
Anchorage, AK 99503

Attn: Jim McGinnis, P.E.

Report Date: 2/20/98
Date Arrived: 2/5/98
Sample Date: 2/1/98
Sample Time:
Collected By:

Client ID: Travel Blank
Client Project #:
Source: Alpine Camp Water System
NTL Lab#: A154125
Sample Matrix: Water
Comments:

** Legend **

MRL = Method Report Level
MCL = Max. Contaminant Level
B = Present In Method Blank
E = Estimated Value
M = Matrix Interference
H = Above MCL
D = Lost To Dilution

Method	Parameter	Units	Result	MRL	Date Prepared	Date Analyzed
EPA 524.2						
	Benzene	ug/L	<MRL	0.20		2/12/98
	Bromobenzene	ug/L	<MRL	0.20		
	Bromochloromethane	ug/L	<MRL	0.20		
	Bromodichloromethane	ug/L	<MRL	0.20		
	Bromoform	ug/L	<MRL	0.50		
	Bromomethane	ug/L	<MRL	1.00		
	n-Butylbenzene	ug/L	<MRL	0.20		
	sec-Butylbenzene	ug/L	<MRL	0.20		
	tert-Butylbenzene	ug/L	<MRL	0.20		
	Carbon Tetrachloride	ug/L	<MRL	0.20		
	Chlorobenzene	ug/L	<MRL	0.20		
	Chloroethane	ug/L	<MRL	1.00		
	Chloroform	ug/L	<MRL	0.30		
	Chloromethane	ug/L	<MRL	0.50		
	2-Chlorotoluene	ug/L	<MRL	0.20		
	4-Chlorotoluene	ug/L	<MRL	0.20		
	Dibromochloromethane	ug/L	<MRL	0.20		
	Dibromomethane	ug/L	<MRL	0.20		
	1,2-Dichlorobenzene	ug/L	<MRL	0.20		
	1,3-Dichlorobenzene	ug/L	<MRL	0.20		
	1,4-Dichlorobenzene	ug/L	<MRL	0.20		
	Dichlorodifluoromethane	ug/L	<MRL	0.50		
	1,1-Dichloroethane	ug/L	<MRL	0.20		

Reported By: Jorma K. Kuusisto
Chemistry Supervisor

NORTHERN TESTING LABORATORIES, INC.

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Michael Baker, Jr., Inc.
4601 Business Park Blvd., Ste. 42
Anchorage, AK 99503

Attn: Jim McGinnis, P.E.

Report Date: 2/20/98
Date Arrived: 2/5/98
Sample Date: 2/1/98
Sample Time:
Collected By:

Client ID: Travel Blank
Client Project #:
Source: Alpine Camp Water System
NTL Lab#: A154125
Sample Matrix: Water
Comments:

** Legend **
MRL = Method Report Level
MCL = Max. Contaminant Level
B = Present In Method Blank
E = Estimated Value
M = Matrix Interference
H = Above MCL
D = Lost To Dilution

Method	Parameter	Units	Result	MRL	Date Prepared	Date Analyzed
	1,2-Dichloroethane	ug/L	<MRL	0.20		2/12/98
	1,1-Dichloroethene	ug/L	<MRL	0.20		
	cis-1,2-Dichloroethene	ug/L	<MRL	0.20		
	trans-1,2-Dichloroethene	ug/L	<MRL	0.20		
	1,2-Dichloropropane	ug/L	<MRL	0.20		
	1,3-Dichloropropane	ug/L	<MRL	0.20		
	2,2-Dichloropropane	ug/L	<MRL	0.20		
	1,1-Dichloropropene	ug/L	<MRL	0.20		
	cis-1,3-Dichloropropene	ug/L	<MRL	0.20		
	trans-1,3-Dichloropropene	ug/L	<MRL	0.20		
	Ethylbenzene	ug/L	<MRL	0.20		
	Hexachlorobutadiene	ug/L	<MRL	0.20		
	Isopropylbenzene	ug/L	<MRL	0.20		
	p-Isopropyltoluene	ug/L	<MRL	0.20		
	Methylene Chloride	ug/L	<MRL	0.50		
	Naphthalene	ug/L	<MRL	0.20		
	n-Propylbenzene	ug/L	<MRL	0.20		
	Styrene	ug/L	<MRL	0.20		
	1,1,1,2-Tetrachloroethane	ug/L	<MRL	0.20		
	1,1,2,2-Tetrachloroethane	ug/L	<MRL	0.20		
	Tetrachloroethene	ug/L	<MRL	0.20		
	Toluene	ug/L	<MRL	0.20		
	1,2,3-Trichlorobenzene	ug/L	<MRL	0.20		
	1,2,4-Trichlorobenzene	ug/L	<MRL	0.20		

Reported By: Jorma K. Kuusisto
Chemistry Supervisor

NORTHERN TESTING LABORATORIES, INC.

3330 INDUSTRIAL AVENUE FAIRBANKS, ALASKA 99701 (907) 456-3116 • FAX 456-3125
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Michael Baker, Jr., Inc.
4601 Business Park Blvd., Ste. 42
Anchorage, AK 99503

Attn: Jim McGinnis, P.E.

Client ID: Travel Blank
Client Project #:
Source: Alpine Camp Water System
NTL Lab#: A154125
Sample Matrix: Water
Comments:

Report Date: 2/20/98
Date Arrived: 2/5/98
Sample Date: 2/1/98
Sample Time:
Collected By:

** Legend **
MRL = Method Report Level
MCL = Max. Contaminant Level
B = Present In Method Blank
E = Estimated Value
M = Matrix Interference
H = Above MCL
D = Lost To Dilution

Method	Parameter	Units	Result	MRL	Date Prepared	Date Analyzed
	1,1,1-Trichloroethane	ug/L	<MRL	0.20		2/12/98
	1,1,2-Trichloroethane	ug/L	<MRL	0.20		
	Trichloroethene	ug/L	<MRL	0.20		
	Trichlorofluoromethane	ug/L	<MRL	0.50		
	1,2,3-Trichloropropane	ug/L	<MRL	0.20		
	1,2,4-Trimethylbenzene	ug/L	<MRL	0.20		
	1,3,5-Trimethylbenzene	ug/L	<MRL	0.20		
	Vinyl Chloride	ug/L	<MRL	0.50		
	p,m-Xylene	ug/L	<MRL	0.20		
	o-Xylene	ug/L	<MRL	0.20		
	Total Xylenes	ug/L	<MRL	0.20		
	Total Trihalomethanes	ug/L	<MRL	0.50		
	BFB (Surr)	% Recovery	92			
	1,2-DCB-d4 (Surr)	% Recovery	90			

Reported By: Jorma K. Kuusisto
Chemistry Supervisor

RECEIVED

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MICHAEL BAKER JR., INC.

NORTHERN TESTING LABORATORIES, INC.

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8005 SCHOON STREET ANCHORAGE, ALASKA 99518 (907) 349-1000 • FAX 349-1016

DRINKING WATER ANALYSIS REPORT FOR TOTAL COLIFORM BACTERIA

Michael Baker Jr., Inc.
4601 Business Park Blvd.; Ste. 42

Anchorage AK 99503

Date Received: 2/2/98 Time Received: 15:10
Date Analyzed: 2/2/98 Time Analyzed:
Date Reported: 2/4/98 Time Reported: 10:11
Next Sample Due:

Phone Number:

Fax Number:

Collected by:

Sample Type Private water Systems

Method of Analysis: MMO-MUG (SM 9223 B)

Purchase Order #: Report #98020001

Comments: Lounsbury & Assoc.

Comments
S = Satisfactory
U = Unsatisfactory
POS = Positive Test Result
ND = None Detected
TNTC = Too Numerous To Count (>200 Colonies)
CG = Confluent Growth
HSM = Heavy Sediment Masking, Results May Not Be Reliable
SA = Sample Age >30 Hours But <48 Hours, Results May Not Be Reliable
Old = Sample Age >48 Hours, Too Old For Analysis
R = Resample Required
NT = No Test

* # Colonies/100 ml ** # Colonies/ml

Sample Date	Sample Time	Total* Coliform	E. Coli	Other* Bacteria	HPC** Result	Lab#	Location	Comments
2/1/98	12:00	ND	ND	NT	NT	NT02912	93-10	Satisfactory
2/1/98	12:01	ND	ND	NT	NT	NT02913	93-12	Satisfactory
2/1/98	12:02	ND	ND	NT	NT	NT02914	93-13	Satisfactory
2/1/98	12:03	ND	ND	NT	NT	NT02915	92-82	Satisfactory

Marian Ruth

Marian Ruth Environmental Analyst 2/4/98
Northern Testing Laboratories, Inc Fairbanks, AK

NORTHERN TESTING LABORATORIES, INC.

3330 INDUSTRIAL AVENUE FAIRBANKS, ALASKA 99701 (907) 456-3116 • FAX 456-3125
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POUCH 340043 PRUDHOE BAY, ALASKA 99734 (907) 659-2145 • FAX 659-2146

Michael Baker, Jr. Inc.
4601 Business Park Blvd.; Ste 42
Anchorage AK 99503

Attn: Jim McGinnis, PE

Report Date: 04/28/98

Date Arrived: 02/04/98
Date Sampled: 02/01/98
Time Sampled: -
Collected By: -

MRL = Method Reporting Limit

* Flag Definitions
B = Below Regulatory Min.
H = Above Regulatory Max.

Our Lab #: F176288
Location/Project: Alpine Camp Water System
Your Sample ID: 93-13
Sample Matrix: Water
Comments:

Lab#	Method	Parameter	Units	Results *	MRL	Digest Prepared	Date Analyzed
F176288	EPA 900.0	Gross Alpha	pCi/L	ND@1+/-0.31			04/01/98

Reported By: Cindy L. Christian
Laboratory Director

NORTHERN TESTING LABORATORIES, INC.
3330 INDUSTRIAL AVENUE FAIRBANKS, ALASKA 99701 (907) 456-3116 • FAX 456-3125
8005 SCHOON STREET ANCHORAGE, ALASKA 99518 (907) 349-1000 • FAX 349-1016

Michael Baker, Jr. Inc.
4601 Business Park Blvd.; Ste 42
Anchorage AK 99503

Attn: Jim McGinnis, PE

Report Date: 03/26/98

Date Arrived: 03/16/98
Date Sampled: 03/13/98
Time Sampled: 1130
Collected By: DD

MRL = Method Reporting Limit

* Flag Definitions
B = Below Regulatory Min.
H = Above Regulatory Max.

Our Lab #: F176936
Location/Project: Alpine Camp Water System
Your Sample ID: 93-13
Sample Matrix: Water
Comments:

Lab#	Method	Parameter	Units	Results *	MRL	Digest Prepared	Date Analyzed
F176936	EPA 150.1	pH	Unit	6.9			03/17/98
	EPA 180.1	Turbidity	NTU	1.7	0.05		03/16/98
	EPA 200.7	Aluminum	mg/L	<MRL	0.055		03/17/98
		Barium	mg/L	0.183	0.002		03/17/98
		Beryllium	mg/L	<MRL	0.0005		03/20/98
		Calcium	mg/L	23.8	0.016		03/19/98
		Iron	mg/L	0.217	0.010		03/17/98
		Hardness as CaCO3	mg/L	93.5	0.1		03/19/98
		Magnesium	mg/L	8.26	0.073		03/19/98
		Manganese	mg/L	0.026	0.003		03/17/98
		Sodium	mg/L	25	0.120		03/17/98
		Nickel	mg/L	<MRL	0.028		03/17/98
		Zinc	mg/L	0.059	0.008		03/17/98
	EPA 200.9	Silver	mg/L	<MRL	0.0001		03/20/98
		Arsenic	mg/L	<MRL	0.003		03/19/98
		Cadmium	mg/L	0.0001	0.0001		03/25/98
		Chromium	mg/L	<MRL	0.002		03/24/98
		Copper	mg/L	<MRL	0.005		03/19/98
		Antimony	mg/L	<MRL	0.003		03/24/98
		Selenium	mg/L	<MRL	0.003		03/25/98
		Thallium	mg/L	<MRL	0.001		03/19/98
	EPA 245.1	Mercury	mg/L	<MRL	0.0002		03/20/98
	EPA 300.0	Chloride	mg/L	48.7	1.40		03/18/98

Cindy L. Christian
Reported By: Cindy L. Christian
Laboratory Director

NORTHERN TESTING LABORATORIES, INC.
3330 INDUSTRIAL AVENUE FAIRBANKS, ALASKA 99701 (907) 456-3116 • FAX 456-3125
8005 SCHOON STREET ANCHORAGE, ALASKA 99518 (907) 349-1000 • FAX 349-1016

Lab#	Method	Parameter	Units	Results	*	MRL	Digest Prepared	Date Analyzed
F176936	EPA 300.0	Fluoride	mg/L	0.06		0.04		03/17/98
		Nitrate-N	mg/L	0.08		0.03		03/17/98
		Sulfate	mg/L	2.40		0.20		03/17/98
	SM2120-B	Color, Apparent	Unit	30	H	5		03/16/98
	SM2150-B	Odor	TON	2		1		03/16/98
	SM2320-B	Alkalinity as CaCO3	mg/L	85		1		03/20/98
		Bicarbonate Alkalinity (as CaCO3)	mg/L	85		1		03/20/98
	SM2330-B	Langelier Index	Unit	-1.4				03/25/98
	SM2540-C	Total Dissolved Solids	mg/L	189		25		03/18/98
	SM4500-CN -E	Total Cyanide	mg/L	<MRL		0.02		03/23/98

Cindy L Christian

Reported By: Cindy L. Christian
Laboratory Director

NORTHERN TESTING LABORATORIES, INC.

3330 INDUSTRIAL AVENUE FAIRBANKS, ALASKA 99701 (907) 456-3116 • FAX 456-3125
8005 SCHOON STREET ANCHORAGE, ALASKA 99518 (907) 349-1000 • FAX 349-1016

Michael Baker, Inc.
4601 Business Park Blvd., Ste. 42
Anchorage, AK 99503

Attn: Jim McGinnis

Report Date: 3/26/98
Date Arrived: 3/17/98
Sample Date: 3/13/98
Sample Time: 11:30
Collected By: DD

Client ID: 93-13 (F176936)
Client Project #:
Source:
NTL Lab#: A154554
Sample Matrix: Water
Comments:

** Legend **

MRL = Method Report Level
MCL = Max. Contaminant Level
B = Present In Method Blank
E = Estimated Value
M = Matrix Interference
H = Above MCL
D = Lost To Dilution

Method	Parameter	Units	Result	MRL	Date Prepared	Date Analyzed
EPA 524.2						
	Benzene	ug/L	1.18	0.20		3/18/98
	Bromobenzene	ug/L	<MRL	0.20		
	Bromochloromethane	ug/L	<MRL	0.20		
	Bromodichloromethane	ug/L	<MRL	0.20		
	Bromoform	ug/L	<MRL	0.50		
	Bromomethane	ug/L	<MRL	1.00		
	n-Butylbenzene	ug/L	<MRL	0.20		
	sec-Butylbenzene	ug/L	<MRL	0.20		
	tert-Butylbenzene	ug/L	<MRL	0.20		
	Carbon Tetrachloride	ug/L	<MRL	0.20		
	Chlorobenzene	ug/L	<MRL	0.20		
	Chloroethane	ug/L	<MRL	1.00		
	Chloroform	ug/L	<MRL	0.30		
	Chloromethane	ug/L	<MRL	0.50		
	2-Chlorotoluene	ug/L	<MRL	0.20		
	4-Chlorotoluene	ug/L	<MRL	0.20		
	Dibromochloromethane	ug/L	<MRL	0.20		
	Dibromomethane	ug/L	<MRL	0.20		
	1,2-Dichlorobenzene	ug/L	<MRL	0.20		
	1,3-Dichlorobenzene	ug/L	<MRL	0.20		
	1,4-Dichlorobenzene	ug/L	<MRL	0.20		
	Dichlorodifluoromethane	ug/L	<MRL	0.50		
	1,1-Dichloroethane	ug/L	<MRL	0.20		

Reported By: Jorma K. Kuusisto
Chemistry Supervisor

NORTHERN TESTING LABORATORIES, INC.

3330 INDUSTRIAL AVENUE FAIRBANKS, ALASKA 99701 (907) 456-3116 • FAX 456-3125
8005 SCHOON STREET ANCHORAGE, ALASKA 99518 (907) 349-1000 • FAX 349-1016

Michael Baker, Inc.
4601 Business Park Blvd., Ste. 42
Anchorage, AK 99503

Attn: Jim McGinnis

Client ID: 93-13 (F176936)
Client Project #:
Source:
NTL Lab#: A154554
Sample Matrix: Water
Comments:

Report Date: 3/26/98
Date Arrived: 3/17/98
Sample Date: 3/13/98
Sample Time: 11:30
Collected By: DD

** Legend **
MRL = Method Report Level
MCL = Max. Contaminant Level
B = Present In Method Blank
E = Estimated Value
M = Matrix Interference
H = Above MCL
D = Lost To Dilution

Method	Parameter	Units	Result	MRL	Date Prepared	Date Analyzed
	1,2-Dichloroethane	ug/L	<MRL	0.20		3/18/98
	1,1-Dichloroethene	ug/L	<MRL	0.20		
	cis-1,2-Dichloroethene	ug/L	<MRL	0.20		
	trans-1,2-Dichloroethene	ug/L	<MRL	0.20		
	1,2-Dichloropropane	ug/L	<MRL	0.20		
	1,3-Dichloropropane	ug/L	<MRL	0.20		
	2,2-Dichloropropane	ug/L	<MRL	0.20		
	1,1-Dichloropropene	ug/L	<MRL	0.20		
	cis-1,3-Dichloropropene	ug/L	<MRL	0.20		
	trans-1,3-Dichloropropene	ug/L	<MRL	0.20		
	Ethylbenzene	ug/L	1.05	0.20		
	Hexachlorobutadiene	ug/L	<MRL	0.20		
	Isopropylbenzene	ug/L	0.22	0.20		
	p-Isopropyltoluene	ug/L	<MRL	0.20		
	Methylene Chloride	ug/L	<MRL	0.50		
	Naphthalene	ug/L	<MRL	0.20		
	n-Propylbenzene	ug/L	0.34	0.20		
	Styrene	ug/L	<MRL	0.20		
	1,1,1,2-Tetrachloroethane	ug/L	<MRL	0.20		
	1,1,2,2-Tetrachloroethane	ug/L	<MRL	0.20		
	Tetrachloroethene	ug/L	<MRL	0.20		
	Toluene	ug/L	6.00	0.20		
	1,2,3-Trichlorobenzene	ug/L	<MRL	0.20		
	1,2,4-Trichlorobenzene	ug/L	<MRL	0.20		

Reported By: Jorma K. Kuusisto
Chemistry Supervisor

NORTHERN TESTING LABORATORIES, INC.

3330 INDUSTRIAL AVENUE FAIRBANKS, ALASKA 99701 (907) 456-3116 • FAX 456-3125
8005 SCHOON STREET ANCHORAGE, ALASKA 99518 (907) 349-1000 • FAX 349-1016

Michael Baker, Inc.
4601 Business Park Blvd., Ste. 42
Anchorage, AK 99503

Attn: Jim McGinnis

Client ID: 93-13 (F176936)
Client Project #:
Source:
NTL Lab#: A154554
Sample Matrix: Water
Comments:

Report Date: 3/26/98
Date Arrived: 3/17/98
Sample Date: 3/13/98
Sample Time: 11:30
Collected By: DD

** Legend **
MRL = Method Report Level
MCL = Max. Contaminant Level
B = Present In Method Blank
E = Estimated Value
M = Matrix Interference
H = Above MCL
D = Lost To Dilution

Method	Parameter	Units	Result	MRL	Date Prepared	Date Analyzed
	1,1,1-Trichloroethane	ug/L	<MRL	0.20		3/18/98
	1,1,2-Trichloroethane	ug/L	<MRL	0.20		
	Trichloroethene	ug/L	<MRL	0.20		
	Trichlorofluoromethane	ug/L	<MRL	0.50		
	1,2,3-Trichloropropane	ug/L	<MRL	0.20		
	1,2,4-Trimethylbenzene	ug/L	1.05	0.20		
	1,3,5-Trimethylbenzene	ug/L	0.58	0.20		
	Vinyl Chloride	ug/L	<MRL	0.50		
	m,p-Xylene	ug/L	3.91	0.20		
	o-Xylene	ug/L	2.16	0.20		
	Total Trihalomethanes	ug/L	<MRL	0.50		
	BFB (Surr)	% Recovery	97			
	1,2-DCB-d4 (Surr)	% Recovery	97			
SM 5540 C						
	Foaming Agents (MBAS)	mg/L	<MRL	0.10	3/19/98	3/19/98

Reported By: Jorma K. Kuusisto
Chemistry Supervisor

NORTHERN TESTING LABORATORIES, INC.

3330 INDUSTRIAL AVENUE FAIRBANKS, ALASKA 99701 (907) 456-3116 • FAX 456-3125
8005 SCHOON STREET ANCHORAGE, ALASKA 99518 (907) 349-1000 • FAX 349-1016

Michael Baker, Inc.
4601 Business Park Blvd., Ste. 42
Anchorage, AK 99503

Attn: Jim McGinnis

Client ID: Travel Blank
Client Project #:
Source:
NTL Lab#: A154555
Sample Matrix: Water
Comments:

Report Date: 3/26/98
Date Arrived: 3/17/98
Sample Date: 3/13/98
Sample Time:
Collected By:

** Legend **
MRL = Method Report Level
MCL = Max. Contaminant Level
B = Present In Method Blank
E = Estimated Value
M = Matrix Interference
H = Above MCL
D = Lost To Dilution

Method	Parameter	Units	Result	MRL	Date Prepared	Date Analyzed
EPA 524.2						
	Benzene	ug/L	<MRL	0.20		3/18/98
	Bromobenzene	ug/L	<MRL	0.20		
	Bromochloromethane	ug/L	<MRL	0.20		
	Bromodichloromethane	ug/L	<MRL	0.20		
	Bromoform	ug/L	<MRL	0.50		
	Bromomethane	ug/L	<MRL	1.00		
	n-Butylbenzene	ug/L	<MRL	0.20		
	sec-Butylbenzene	ug/L	<MRL	0.20		
	tert-Butylbenzene	ug/L	<MRL	0.20		
	Carbon Tetrachloride	ug/L	<MRL	0.20		
	Chlorobenzene	ug/L	<MRL	0.20		
	Chloroethane	ug/L	<MRL	1.00		
	Chloroform	ug/L	<MRL	0.30		
	Chloromethane	ug/L	<MRL	0.50		
	2-Chlorotoluene	ug/L	<MRL	0.20		
	4-Chlorotoluene	ug/L	<MRL	0.20		
	Dibromochloromethane	ug/L	<MRL	0.20		
	Dibromomethane	ug/L	<MRL	0.20		
	1,2-Dichlorobenzene	ug/L	<MRL	0.20		
	1,3-Dichlorobenzene	ug/L	<MRL	0.20		
	1,4-Dichlorobenzene	ug/L	<MRL	0.20		
	Dichlorodifluoromethane	ug/L	<MRL	0.50		
	1,1-Dichloroethane	ug/L	<MRL	0.20		

Reported By: Jorma K. Kuusisto
Chemistry Supervisor

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Michael Baker, Inc.
4601 Business Park Blvd., Ste. 42
Anchorage, AK 99503

Attn: Jim McGinnis

Client ID: Travel Blank
Client Project #:
Source:
NTL Lab#: A154555
Sample Matrix: Water
Comments:

Report Date: 3/26/98
Date Arrived: 3/17/98
Sample Date: 3/13/98
Sample Time:
Collected By:

** Legend **
MRL = Method Report Level
MCL = Max. Contaminant Level
B = Present In Method Blank
E = Estimated Value
M = Matrix Interference
H = Above MCL
D = Lost To Dilution

Method	Parameter	Units	Result	MRL	Date Prepared	Date Analyzed
	1,2-Dichloroethane	ug/L	<MRL	0.20		3/18/98
	1,1-Dichloroethene	ug/L	<MRL	0.20		
	cis-1,2-Dichloroethene	ug/L	<MRL	0.20		
	trans-1,2-Dichloroethene	ug/L	<MRL	0.20		
	1,2-Dichloropropane	ug/L	<MRL	0.20		
	1,3-Dichloropropane	ug/L	<MRL	0.20		
	2,2-Dichloropropane	ug/L	<MRL	0.20		
	1,1-Dichloropropene	ug/L	<MRL	0.20		
	cis-1,3-Dichloropropene	ug/L	<MRL	0.20		
	trans-1,3-Dichloropropene	ug/L	<MRL	0.20		
	Ethylbenzene	ug/L	<MRL	0.20		
	Hexachlorobutadiene	ug/L	<MRL	0.20		
	Isopropylbenzene	ug/L	<MRL	0.20		
	p-Isopropyltoluene	ug/L	<MRL	0.20		
	Methylene Chloride	ug/L	<MRL	0.50		
	Naphthalene	ug/L	<MRL	0.20		
	n-Propylbenzene	ug/L	<MRL	0.20		
	Styrene	ug/L	<MRL	0.20		
	1,1,1,2-Tetrachloroethane	ug/L	<MRL	0.20		
	1,1,2,2-Tetrachloroethane	ug/L	<MRL	0.20		
	Tetrachloroethene	ug/L	<MRL	0.20		
	Toluene	ug/L	<MRL	0.20		
	1,2,3-Trichlorobenzene	ug/L	<MRL	0.20		
	1,2,4-Trichlorobenzene	ug/L	<MRL	0.20		

Reported By: Jorma K. Kuusisto
Chemistry Supervisor

NORTHERN TESTING LABORATORIES, INC.

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Michael Baker, Inc.
4601 Business Park Blvd., Ste. 42
Anchorage, AK 99503

Attn: Jim McGinnis

Client ID: Travel Blank
Client Project #:
Source:
NTL Lab#: A154555
Sample Matrix: Water
Comments:

Report Date: 3/26/98
Date Arrived: 3/17/98
Sample Date: 3/13/98
Sample Time:
Collected By:

** Legend **
MRL = Method Report Level
MCL = Max. Contaminant Level
B = Present In Method Blank
E = Estimated Value
M = Matrix Interference
H = Above MCL
D = Lost To Dilution

Method	Parameter	Units	Result	MRL	Date Prepared	Date Analyzed
	1,1,1-Trichloroethane	ug/L	<MRL	0.20		3/18/98
	1,1,2-Trichloroethane	ug/L	<MRL	0.20		
	Trichloroethene	ug/L	<MRL	0.20		
	Trichlorofluoromethane	ug/L	<MRL	0.50		
	1,2,3-Trichloropropane	ug/L	<MRL	0.20		
	1,2,4-Trimethylbenzene	ug/L	<MRL	0.20		
	1,3,5-Trimethylbenzene	ug/L	<MRL	0.20		
	Vinyl Chloride	ug/L	<MRL	0.50		
	m,p-Xylene	ug/L	<MRL	0.20		
	o-Xylene	ug/L	<MRL	0.20		
	Total Trihalomethanes	ug/L	<MRL	0.50		
	BFB (Surr)	% Recovery	87			
	1,2-DCB-d4 (Surr)	% Recovery	82			

Reported By: Jorma K. Kuusisto
Chemistry Supervisor

NORTHERN TESTING LABORATORIES, INC.
3330 INDUSTRIAL AVENUE FAIRBANKS, ALASKA 99701 (907) 456-3116 • FAX 456-3125
8005 SCHOON STREET ANCHORAGE, ALASKA 99518 (907) 349-1000 • FAX 349-1016
POUCH 340043 PRUDHOE BAY, ALASKA 99734 (907) 659-2145 • FAX 659-2146

Report Date: 15 March 98 Report No.: 98030021

Report of Analysis

Bonnie Buteyn
Northern Testing Laboratories
3330 Industrial Avenue
Fairbanks, AK 99701
(907)456-3116

Field ID Number	93-13		
Sample Description	AK1976		
Date/Time Sampled	03/13/98	@11:30	by DD
Date/Time Received	03/14/98	@08:29	by JEP
NTL Lab Number	NT03021		

Analyte	Result	Units	MDL	Method	Preparation Date	Analysis Date	Analyst
Total Coliform P-A	Not detected			SM 9221D	03/14/98	03/15/98	JEP

Approved by: Jerry Pollen
Don Cook / Jerry Pollen
Chemist / Lab Tech

NORTHERN TESTING LABORATORIES, INC.

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POUCH 340043 PRUDHOE BAY, ALASKA 99734 (907) 659-2145 • FAX 659-2146

Michael Baker, Jr. Inc.
4601 Business Park Blvd.; Ste 42
Anchorage AK 99503

Attn: Jim McGinnis, PE

Report Date: 04/28/98

Date Arrived: 03/16/98
Date Sampled: 03/13/98
Time Sampled: 1130
Collected By: DD

MRL = Method Reporting Limit

* Flag Definitions
B = Below Regulatory Min.
H = Above Regulatory Max.

Our Lab #: F176943
Location/Project: Alpine Camp Water System
Your Sample ID: 93-13
Sample Matrix: Water
Comments:

Lab#	Method	Parameter	Units	Results *	MRL	Digest Prepared	Date Analyzed
F176943	EPA 900.0	Gross Alpha	pCi/L	ND@1+/-0.34			04/08/98

Reported By: Cindy L. Christian
Laboratory Director

NORTHERN TESTING LABORATORIES, INC.

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8005 SCHOON STREET ANCHORAGE, ALASKA 99518 (907) 349-1000 • FAX 349-1016
POUCH 340043 PRUDHOE BAY, ALASKA 99734 (907) 659-2145 • FAX 659-2146

Michael Baker, Jr. Inc.
4601 Business Park Blvd.; Ste 42
Anchorage AK 99503

Attn: Jim McGinnis, PE

Report Date: 04/13/98

Date Arrived: 03/30/98
Date Sampled: 03/27/98
Time Sampled: 1315
Collected By: LL

MRL = Method Reporting Limit

* Flag Definitions
B = Below Regulatory Min.
H = Above Regulatory Max.

Our Lab #: F177159
Location/Project: Alpine Camp Water System
Your Sample ID: 93-13
Sample Matrix: Water
Comments:

Lab#	Method	Parameter	Units	Results *	MRL	Digest Prepared	Date Analyzed
F177159	EPA 150.1	pH	Unit	6.9			03/30/98
	EPA 180.1	Turbidity	NTU	1.4	0.05		03/30/98
	EPA 200.7	Aluminum	mg/L	<MRL	0.055		04/06/98
		Barium	mg/L	0.196	0.002		04/03/98
		Beryllium	mg/L	<MRL	0.0005		04/06/98
		Calcium	mg/L	21.5	0.016		04/06/98
		Iron	mg/L	0.247	0.010		04/06/98
		Hardness as CaCO3	mg/L	91.3	0.1		04/06/98
		Magnesium	mg/L	9.11	0.073		04/06/98
		Manganese	mg/L	0.029	0.003		04/06/98
		Sodium	mg/L	25.8	0.120		04/02/98
		Nickel	mg/L	<MRL	0.028		04/06/98
		Zinc	mg/L	0.012	0.008		04/06/98
	EPA 200.9	Silver	mg/L	<MRL	0.0001		04/01/98
		Arsenic	mg/L	<MRL	0.003		04/10/98
		Cadmium	mg/L	0.0001	0.0001		04/01/98
		Chromium	mg/L	<MRL	0.002		04/07/98
		Copper	mg/L	<MRL	0.005		04/08/98
		Antimony	mg/L	<MRL	0.003		04/10/98
		Selenium	mg/L	<MRL	0.003		04/04/98
		Thallium	mg/L	<MRL	0.001		04/10/98
	EPA 245.1	Mercury	mg/L	<MRL	0.0002		04/06/98
	EPA 300.0	Chloride	mg/L	54.8	2.80		04/01/98

Cindy L. Christian

Reported By: Cindy L. Christian
Laboratory Director

NORTHERN TESTING LABORATORIES, INC.
3330 INDUSTRIAL AVENUE FAIRBANKS, ALASKA 99701 (907) 456-3116 • FAX 456-3125
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POUCH 340043 PRUDHOE BAY, ALASKA 99734 (907) 659-2145 • FAX 659-2146

Lab#	Method	Parameter	Units	Results *		MRL	Digest Prepared	Date Analyzed
F177159	EPA 300.0	Fluoride	mg/L	0.05		0.04		03/31/98
		Nitrate-N	mg/L	0.07		0.03		03/31/98
		Sulfate	mg/L	2.49		0.20		03/31/98
	SM2120-B	Color, Apparent	Unit	10		5		03/30/98
	SM2150-B	Odor	TON	4	H	1		03/30/98
	SM2320-B	Alkalinity as CaCO3	mg/L	84		1		04/02/98
		Bicarbonate Alkalinity (as CaCO3)	mg/L	84		1		04/07/98
	SM2330-B	Langelier Index	Unit	-1.4				04/13/98
	SM2540-C	Total Dissolved Solids	mg/L	168		20		03/31/98
	SM4500-CN -E	Total Cyanide	mg/L	<MRL		0.02		04/01/98

Cindy L Christian

Reported By: Cindy L. Christian
Laboratory Director

NORTHERN TESTING LABORATORIES, INC.

3330 INDUSTRIAL AVENUE	FAIRBANKS, ALASKA 99701	(907) 456-3116 • FAX 456-3125
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POUCH 340043	PRUDHOE BAY, ALASKA 99734	(907) 659-2145 • FAX 659-2146

Michael Baker, Inc.
4601 Business Park Blvd., Ste. 42
Anchorage, AK 99503

Attn: Jim McGinnis

Client ID: 93-13 (F177159)
Client Project #:
Source:
NTL Lab#: A154705
Sample Matrix: Water
Comments: MBAS received/analyzed beyond recommended holding time

Report Date: 4/8/98
Date Arrived: 3/31/98
Sample Date: 3/27/98
Sample Time: 13:15
Collected By: L.L.

** Legend **

MRL = Method Report Level
MCL = Max. Contaminant Level
B = Present In Method Blank
E = Estimated Value
M = Matrix Interference
H = Above MCL
D = Lost To Dilution

Method	Parameter	Units	Result	MRL	Date Prepared	Date Analyzed
EPA 524.2						
	Benzene	ug/L	0.88	0.20		4/1/98
	Bromobenzene	ug/L	<MRL	0.20		
	Bromochloromethane	ug/L	<MRL	0.20		
	Bromodichloromethane	ug/L	<MRL	0.20		
	Bromoform	ug/L	<MRL	0.50		
	Bromomethane	ug/L	<MRL	1.00		
	n-Butylbenzene	ug/L	<MRL	0.20		
	sec-Butylbenzene	ug/L	<MRL	0.20		
	tert-Butylbenzene	ug/L	<MRL	0.20		
	Carbon Tetrachloride	ug/L	<MRL	0.20		
	Chlorobenzene	ug/L	<MRL	0.20		
	Chloroethane	ug/L	<MRL	1.00		
	Chloroform	ug/L	<MRL	0.30		
	Chloromethane	ug/L	<MRL	0.50		
	2-Chlorotoluene	ug/L	<MRL	0.20		
	4-Chlorotoluene	ug/L	<MRL	0.20		
	Dibromochloromethane	ug/L	<MRL	0.20		
	Dibromomethane	ug/L	<MRL	0.20		
	1,2-Dichlorobenzene	ug/L	<MRL	0.20		
	1,3-Dichlorobenzene	ug/L	<MRL	0.20		
	1,4-Dichlorobenzene	ug/L	<MRL	0.20		
	Dichlorodifluoromethane	ug/L	<MRL	0.50		
	1,1-Dichloroethane	ug/L	<MRL	0.20		

Reported By: Jorma K. Kuusisto
Chemistry Supervisor

NORTHERN TESTING LABORATORIES, INC.

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POUCH 340043 · PRUDHOE BAY, ALASKA 99734 · (907) 659-2145 • FAX 659-2146

Michael Baker, Inc.
4601 Business Park Blvd., Ste. 42
Anchorage, AK 99503

Attn: Jim McGinnis

Report Date: 4/8/98
Date Arrived: 3/31/98
Sample Date: 3/27/98
Sample Time: 13:15
Collected By: L.L.

Client ID: 93-13 (F177159)
Client Project #:
Source:
NTL Lab#: A154705
Sample Matrix: Water
Comments: MBAS received/analyzed beyond recommended holding time

** Legend **
MRL = Method Report Level
MCL = Max. Contaminant Level
B = Present In Method Blank
E = Estimated Value
M = Matrix Interference
H = Above MCL
D = Lost To Dilution

Method	Parameter	Units	Result	MRL	Date Prepared	Date Analyzed
	1,2-Dichloroethane	ug/L	<MRL	0.20		4/1/98
	1,1-Dichloroethene	ug/L	<MRL	0.20		
	cis-1,2-Dichloroethene	ug/L	<MRL	0.20		
	trans-1,2-Dichloroethene	ug/L	<MRL	0.20		
	1,2-Dichloropropane	ug/L	<MRL	0.20		
	1,3-Dichloropropane	ug/L	<MRL	0.20		
	2,2-Dichloropropane	ug/L	<MRL	0.20		
	1,1-Dichloropropene	ug/L	<MRL	0.20		
	cis-1,3-Dichloropropene	ug/L	<MRL	0.20		
	trans-1,3-Dichloropropene	ug/L	<MRL	0.20		
	Ethylbenzene	ug/L	1.27	0.20		
	Hexachlorobutadiene	ug/L	<MRL	0.20		
	Isopropylbenzene	ug/L	0.27	0.20		
	p-Isopropyltoluene	ug/L	<MRL	0.20		
	Methylene Chloride	ug/L	<MRL	0.50		
	Naphthalene	ug/L	<MRL	0.20		
	n-Propylbenzene	ug/L	0.42	0.20		
	Styrene	ug/L	<MRL	0.20		
	1,1,1,2-Tetrachloroethane	ug/L	<MRL	0.20		
	1,1,2,2-Tetrachloroethane	ug/L	<MRL	0.20		
	Tetrachloroethene	ug/L	<MRL	0.20		
	Toluene	ug/L	6.79	0.20		
	1,2,3-Trichlorobenzene	ug/L	<MRL	0.20		
	1,2,4-Trichlorobenzene	ug/L	<MRL	0.20		

Reported By: Jorma K. Kuusisto
Chemistry Supervisor

NORTHERN TESTING LABORATORIES, INC.

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Michael Baker, Inc.
4601 Business Park Blvd., Ste. 42
Anchorage, AK 99503

Attn: Jim McGinnis

Client ID: 93-13 (F177159)
Client Project #:
Source:
NTL Lab#: A154705
Sample Matrix: Water
Comments: MBAS received/analyzed beyond recommended holding time

Report Date: 4/8/98
Date Arrived: 3/31/98
Sample Date: 3/27/98
Sample Time: 13:15
Collected By: L.L.

** Legend **
MRL = Method Report Level
MCL = Max. Contaminant Level
B = Present In Method Blank
E = Estimated Value
M = Matrix Interference
H = Above MCL
D = Lost To Dilution

Method	Parameter	Units	Result	MRL	Date Prepared	Date Analyzed
	1,1,1-Trichloroethane	ug/L	<MRL	0.20		4/1/98
	1,1,2-Trichloroethane	ug/L	<MRL	0.20		
	Trichloroethene	ug/L	<MRL	0.20		
	Trichlorofluoromethane	ug/L	<MRL	0.50		
	1,2,3-Trichloropropane	ug/L	<MRL	0.20		
	1,2,4-Trimethylbenzene	ug/L	1.35	0.20		
	1,3,5-Trimethylbenzene	ug/L	1.43	0.20		
	Vinyl Chloride	ug/L	<MRL	0.50		
	m,p-Xylene	ug/L	5.28	0.20		
	o-Xylene	ug/L	2.68	0.20		
	Total Trihalomethanes	ug/L	<MRL	0.50		
	BFB (Surr)	% Recovery	100			
	1,2-DCB-d4 (Surr)	% Recovery	102			
SM 5540 C						
	Foaming Agents (MBAS)	mg/L	<MRL	0.10	4/6/98	4/7/98

Reported By: Jorma K. Kuusisto
Chemistry Supervisor

NORTHERN TESTING LABORATORIES, INC.

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POUCH 340043 PRUDHOE BAY, ALASKA 99734 (907) 659-2145 • FAX 659-2146

DRINKING WATER ANALYSIS REPORT FOR TOTAL COLIFORM BACTERIA

Michael Baker Jr., Inc.
4601 Business Park Blvd.; Ste. 42

Anchorage AK 99503

Date Received: 3/28/98 Time Received: 13:50
Date Analyzed: 3/29/98 Time Analyzed: 14:30
Date Reported: 4/2/98 Time Reported: 09:31
Next Sample Due:

Phone Number:

Fax Number:

Collected by: LL

Sample Type Special Purpose

Method of Analysis: MMO-MUG (SM 9223 B)

Comments: Lounsbury & Associates

Comments
- S = Satisfactory
- U = Unsatisfactory
- POS = Positive Test Result
- ND = None Detected
- TNTC = Too Numerous To Count (>200 Colonies)
- CG = Confluent Growth
- HSM = Heavy Sediment Masking, Results May Not Be Reliable
- SA = Sample Age >30 Hours But <48 Hours, Results May Not Be Reliable
- Old = Sample Age >48 Hours, Too Old For Analysis
- R = Resample Required
- NT = No Test

* # Colonies/100 ml ** # Colonies/ml

Sample Date	Sample Time	Total* Coliform	E. Coli	Other* Bacteria	HPC** Result	Lab#	Location	Comments
3/27/98	10:30	ND	ND	NT	NT	AK1985	93-12	Satisfactory
3/27/98	15:55	ND	ND	NT	NT	AK1986	93-21	Satisfactory
3/27/98	14:45	ND	ND	NT	NT	AK1987	93-15	Satisfactory
3/27/98	12:00	ND	ND	NT	NT	AK1988	93-10	Satisfactory
3/27/98	15:25	ND	ND	NT	NT	AK1989	93-22	Satisfactory
3/27/98	12:40	ND	ND	NT	NT	AK1990	92-82	Satisfactory
3/27/98	13:15	ND	ND	NT	NT	AK1991	93-13	Satisfactory

Cindy L. Christian Laboratory Director 4/2/98
Northern Testing Laboratories, Inc Fairbanks, AK

NORTHERN TESTING LABORATORIES, INC.

3330 INDUSTRIAL AVENUE FAIRBANKS, ALASKA 99701 (907) 456-3116 • FAX 456-3125
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POUCH 340043 PRUDHOE BAY, ALASKA 99734 (907) 659-2145 • FAX 659-2146

Michael Baker, Jr. Inc.
4601 Business Park Blvd.; Ste 42
Anchorage AK 99503

Attn: Jim McGinnis, PE

Report Date: 06/10/98

Date Arrived: 03/30/98
Date Sampled: 03/27/98
Time Sampled: 1315
Collected By: LL

MRL = Method Reporting Limit

* Flag Definitions
B = Below Regulatory Min.
H = Above Regulatory Max.

Our Lab #: F177152
Location/Project: Alpine Camp Water System
Your Sample ID: 93-13
Sample Matrix: Water
Comments:

Lab#	Method	Parameter	Units	Results *	MRL	Digest Prepared	Date Analyzed
F177152	EPA 900.0	Gross Alpha	pCi/L	ND@1+/-0.31			05/24/98

Reported By: Cindy L. Christian
Laboratory Director

NORTHERN TESTING LABORATORIES, INC.

3330 INDUSTRIAL AVENUE, FAIRBANKS, ALASKA 99701, (907) 456-3116 • FAX 456-3125
8005 SCHOON STREET, ANCHORAGE, ALASKA 99518, (907) 349-1000 • FAX 349-1016
POUCH 340043, PRUDHOE BAY, ALASKA 99734, (907) 659-2145 • FAX 659-2146

Michael Baker, Jr. Inc.
4601 Business Park Blvd.; Ste 42
Anchorage AK 99503

Attn: Jim McGinnis, PE

Report Date: 05/04/98

Date Arrived: 04/15/98
Date Sampled: 04/12/98
Time Sampled: 1145
Collected By: -

MRL = Method Reporting Limit

* Flag Definitions
B = Below Regulatory Min.
H = Above Regulatory Max.

Our Lab #: F177424
Location/Project: Alpine Camp Water System
Your Sample ID: 93-13
Sample Matrix: Water
Comments:

Lab#	Method	Parameter	Units	Results *	MRL	Digest Prepared	Date Analyzed
F177424	EPA 150.1	pH	Unit	7.6			04/15/98
	EPA 180.1	Turbidity	NTU	1.4	0.05		04/16/98
	EPA 200.7	Aluminum	mg/L	<MRL	0.055		04/29/98
		Barium	mg/L	0.195	0.002		04/29/98
		Beryllium	mg/L	<MRL	0.0005		04/29/98
		Calcium	mg/L	20.7	0.016		04/29/98
		Iron	mg/L	0.22	0.010		04/30/98
		Hardness as CaCO3	mg/L	88.4	0.1		04/29/98
		Magnesium	mg/L	8.9	0.073		04/29/98
		Manganese	mg/L	0.060 H	0.003		04/29/98
		Sodium	mg/L	24.5	0.600		04/30/98
		Nickel	mg/L	<MRL	0.028		04/29/98
		Zinc	mg/L	0.024	0.008		04/29/98
	EPA 200.9	Silver	mg/L	<MRL	0.0001		04/21/98
		Arsenic	mg/L	<MRL	0.003		04/16/98
		Cadmium	mg/L	<MRL	0.0001		04/17/98
		Chromium	mg/L	<MRL	0.002		04/22/98
		Copper	mg/L	<MRL	0.005		04/27/98
		Antimony	mg/L	<MRL	0.003		04/28/98
		Selenium	mg/L	<MRL	0.003		04/27/98
		Thallium	mg/L	<MRL	0.001		04/23/98
	EPA 245.1	Mercury	mg/L	<MRL	0.0002		04/27/98
	EPA 300.0	Chloride	mg/L	43.6	3.50		05/02/98

Cindy L. Christian

Reported By: Cindy L. Christian
Laboratory Director

NORTHERN TESTING LABORATORIES, INC.

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POUCH 340043 PRUDHOE BAY, ALASKA 99734 (907) 659-2145 • FAX 659-2146

Lab#	Method	Parameter	Units	Results	*	MRL	Digest Prepared	Date Analyzed
F177424	EPA 300.0	Fluoride	mg/L	0.05		0.04		04/15/98
		Nitrate-N	mg/L	0.03		0.03		04/15/98
		Sulfate	mg/L	2.13		0.20		04/15/98
	SM2120-B	Color, Apparent	Unit	15		5		04/15/98
	SM2150-B	Odor	TON	4	H	1		04/15/98
	SM2320-B	Alkalinity as CaCO3	mg/L	83		1		04/15/98
		Bicarbonate Alkalinity (as CaCO3)	mg/L	83		1		04/15/98
	SM2330-B	Langelier Index	Unit	-0.7				04/30/98
	SM2540-C	Total Dissolved Solids	mg/L	148		20		04/17/98
	SM4500-CN -E	Total Cyanide	mg/L	<MRL		0.02		04/16/98

Cindy L Christian

Reported By: Cindy L. Christian
Laboratory Director

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Michael Baker, Inc.
4601 Business Park Blvd., Ste. 42
Anchorage, AK 99503

Attn: Jim McGinnis

Client ID: 93-13 (F177424)
Client Project #:
Source: AK 2066
NTL Lab#: A154907
Sample Matrix: Water
Comments: MBAS exceeded 48 hour holding time, VOC vials contained head space.

Report Date: 4/28/98
Date Arrived: 4/16/98
Sample Date: 4/12/98
Sample Time: 14:00
Collected By:

** Legend **
MRL = Method Report Level
MCL = Max. Contaminant Level
B = Present In Method Blank
E = Estimated Value
M = Matrix Interference
H = Above MCL
D = Lost To Dilution

Method	Parameter	Units	Result		MRL	Date Prepared	Date Analyzed
EPA 524.2							
	Benzene	ug/L	6.32	H	0.20		4/17/98
	Bromobenzene	ug/L	<MRL		0.20		
	Bromochloromethane	ug/L	<MRL		0.20		
	Bromodichloromethane	ug/L	<MRL		0.20		
	Bromoform	ug/L	<MRL		0.50		
	Bromomethane	ug/L	<MRL		1.00		
	n-Butylbenzene	ug/L	0.60		0.20		
	sec-Butylbenzene	ug/L	0.67		0.20		
	tert-Butylbenzene	ug/L	<MRL		0.20		
	Carbon Tetrachloride	ug/L	<MRL		0.20		
	Chlorobenzene	ug/L	<MRL		0.20		
	Chloroethane	ug/L	<MRL		1.00		
	Chloroform	ug/L	<MRL		0.30		
	Chloromethane	ug/L	<MRL		0.50		
	2-Chlorotoluene	ug/L	<MRL		0.20		
	4-Chlorotoluene	ug/L	<MRL		0.20		
	Dibromochloromethane	ug/L	<MRL		0.20		
	Dibromomethane	ug/L	<MRL		0.20		
	1,2-Dichlorobenzene	ug/L	<MRL		0.20		
	1,3-Dichlorobenzene	ug/L	<MRL		0.20		
	1,4-Dichlorobenzene	ug/L	<MRL		0.20		
	Dichlorodifluoromethane	ug/L	<MRL		0.50		
	1,1-Dichloroethane	ug/L	<MRL		0.20		

Jorma Kuusisto

Reported By: Jorma K. Kuusisto
Chemistry Supervisor

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Michael Baker, Inc.
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Anchorage, AK 99503

Attn: Jim McGinnis

Client ID: 93-13 (F177424)
Client Project #:
Source: AK 2066
NTL Lab#: A154907
Sample Matrix: Water
Comments: MBAS exceeded 48 hour holding time, VOC vials contained head space.

Report Date: 4/28/98
Date Arrived: 4/16/98
Sample Date: 4/12/98
Sample Time: 14:00
Collected By:

** Legend **
MRL = Method Report Level
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B = Present In Method Blank
E = Estimated Value
M = Matrix Interference
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D = Lost To Dilution

Method	Parameter	Units	Result	MRL	Date Prepared	Date Analyzed
	1,2-Dichloroethane	ug/L	<MRL	0.20		4/17/98
	1,1-Dichloroethene	ug/L	<MRL	0.20		
	cis-1,2-Dichloroethene	ug/L	<MRL	0.20		
	trans-1,2-Dichloroethene	ug/L	<MRL	0.20		
	1,2-Dichloropropane	ug/L	<MRL	0.20		
	1,3-Dichloropropane	ug/L	<MRL	0.20		
	2,2-Dichloropropane	ug/L	<MRL	0.20		
	1,1-Dichloropropene	ug/L	<MRL	0.20		
	cis-1,3-Dichloropropene	ug/L	<MRL	0.20		
	trans-1,3-Dichloropropene	ug/L	<MRL	0.20		
	Ethylbenzene	ug/L	10.7	0.20		
	Hexachlorobutadiene	ug/L	<MRL	0.20		
	Isopropylbenzene	ug/L	1.88	0.20		
	p-Isopropyltoluene	ug/L	0.66	0.20		
	Methylene Chloride	ug/L	<MRL	0.50		
	Naphthalene	ug/L	<MRL	0.20		
	n-Propylbenzene	ug/L	3.17	0.20		
	Styrene	ug/L	<MRL	0.20		
	1,1,1,2-Tetrachloroethane	ug/L	<MRL	0.20		
	1,1,2,2-Tetrachloroethane	ug/L	<MRL	0.20		
	Tetrachloroethene	ug/L	<MRL	0.20		
	Toluene	ug/L	63.5	2.00		
	1,2,3-Trichlorobenzene	ug/L	<MRL	0.20		
	1,2,4-Trichlorobenzene	ug/L	<MRL	0.20		

Reported By: Jorma K. Kuusisto
Chemistry Supervisor

NORTHERN TESTING LABORATORIES, INC.

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Michael Baker, Inc.
4601 Business Park Blvd., Ste. 42
Anchorage, AK 99503

Attn: Jim McGinnis

Client ID: 93-13 (F177424)
Client Project #:
Source: AK 2066
NTL Lab#: A154907
Sample Matrix: Water
Comments: MBAS exceeded 48 hour holding time, VOC vials contained head space.

Report Date: 4/28/98
Date Arrived: 4/16/98
Sample Date: 4/12/98
Sample Time: 14:00
Collected By:

** Legend **

MRL = Method Report Level
MCL = Max. Contaminant Level
B = Present In Method Blank
E = Estimated Value
M = Matrix Interference
H = Above MCL
D = Lost To Dilution

Method	Parameter	Units	Result	MRL	Date Prepared	Date Analyzed
	1,1,1-Trichloroethane	ug/L	<MRL	0.20		4/17/98
	1,1,2-Trichloroethane	ug/L	<MRL	0.20		
	Trichloroethene	ug/L	<MRL	0.20		
	Trichlorofluoromethane	ug/L	<MRL	0.50		
	1,2,3-Trichloropropane	ug/L	<MRL	0.20		
	1,2,4-Trimethylbenzene	ug/L	7.09	0.20		
	1,3,5-Trimethylbenzene	ug/L	10.9	0.20		
	Vinyl Chloride	ug/L	<MRL	0.50		
	m,p-Xylene	ug/L	34.8	2.00		
	o-Xylene	ug/L	18.1	0.20		
	Total Trihalomethanes	ug/L	<MRL	0.50		
	BFB (Surr)	% Recovery	112			
	1,2-DCB-d4 (Surr)	% Recovery	113			
SM 5540 C						
	Foaming Agents (MBAS)	mg/L	<MRL	0.10	4/17/98	4/17/98

Reported By: Jorma K. Kuusisto
Chemistry Supervisor

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Michael Baker, Jr. Inc.
4601 Business Park Blvd.; Ste 42
Anchorage AK 99503

Attn: Jim McGinnis, PE

Report Date: 06/10/98

Date Arrived: 04/15/98
Date Sampled: 04/12/98
Time Sampled: 1145
Collected By: -

MRL = Method Reporting Limit

* Flag Definitions
B = Below Regulatory Min.
H = Above Regulatory Max.

Our Lab #: F177431
Location/Project: Alpine Camp Water System
Your Sample ID: 93-13
Sample Matrix: Water
Comments:

Lab#	Method	Parameter	Units	Results *	MRL	Digest Prepared	Date Analyzed
F177431	EPA 900.0	Gross Alpha	pCi/L	ND@1+/-0.31			05/26/98

Reported By: Cindy L. Christian
Laboratory Director

NORTHERN TESTING LABORATORIES, INC.

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Michael Baker, Jr. Inc.
4601 Business Park Blvd.; Ste 42
Anchorage AK 99503

Attn: Jim McGinnis, PE

Report Date: 05/15/98

Date Arrived: 04/29/98
Date Sampled: 04/26/98
Time Sampled: 1340
Collected By: WP

MRL = Method Reporting Limit

* Flag Definitions
B = Below Regulatory Min.
H = Above Regulatory Max.

Our Lab #: F177661
Location/Project: Alpine Camp Water System
Your Sample ID: 93-13
Sample Matrix: Water
Comments:

Lab#	Method	Parameter	Units	Results *	MRL	Digest Prepared	Date Analyzed
F177661	EPA 200.7	Aluminum	mg/L	<MRL	0.055		05/12/98
		Barium	mg/L	0.212	0.002		05/12/98
		Beryllium	mg/L	<MRL	0.0005		05/12/98
		Calcium	mg/L	25.9	0.016		05/12/98
		Copper	mg/L	<MRL	0.008		05/12/98
		Iron	mg/L	0.217	0.010		05/12/98
		Hardness as CaCO3	mg/L	110	0.1		05/12/98
		Magnesium	mg/L	11	0.073		05/12/98
		Manganese	mg/L	0.022	0.003		05/13/98
		Sodium	mg/L	27.2	0.600		05/13/98
		Nickel	mg/L	<MRL	0.028		05/12/98
		Zinc	mg/L	0.009	0.008		05/12/98
	EPA 200.9	Silver	mg/L	<MRL	0.0001		05/07/98
		Arsenic	mg/L	<MRL	0.003		05/08/98
		Cadmium	mg/L	0.0001	0.0001		04/30/98
		Chromium	mg/L	<MRL	0.002		05/08/98
		Antimony	mg/L	<MRL	0.003		05/13/98
		Selenium	mg/L	<MRL	0.003		04/30/98
		Thallium	mg/L	<MRL	0.001		05/14/98
	EPA 245.1	Mercury	mg/L	<MRL	0.0002		05/06/98
	EPA 300.0	Chloride	mg/L	54.5	1.40		05/13/98
		Fluoride	mg/L	0.09	0.04		05/05/98
		Nitrate-N	mg/L	0.05	0.03		05/02/98
		Sulfate	mg/L	2.58	0.20		05/05/98

Cindy L. Christian

Reported By: Cindy L. Christian
Laboratory Director

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Lab#	Method	Parameter	Units	Results *	MRL	Digest Prepared	Date Analyzed
F177661	SM2120-B	Color, Apparent	Unit	10	5		04/29/98
	SM2130-B	Turbidity	NTU	1.45	0.05		04/29/98
	SM2150-B	Odor	TON	4 H	1		04/29/98
	SM2320-B	Alkalinity as CaCO3	mg/L	99	5		05/01/98
		Bicarbonate Alkalinity (as CaCO3)	mg/L	99	1		05/01/98
	SM2330-B	Langelier Index	Unit	-1.2			05/14/98
	SM2540-C	Total Dissolved Solids	mg/L	192	1		04/30/98
	SM4500-CN -E	Total Cyanide	mg/L	<MRL	0.02		05/06/98
	SM4500-H- B	pH	Unit	7.0			04/29/98

Cindy L Christian

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Laboratory Director

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Michael Baker, Inc.
4601 Business Park Blvd., Ste. 42
Anchorage, AK 99503

Attn: Jim McGinnis

Client ID: 93-13
Client Project #:
Source:
NTL Lab#: A155019
Sample Matrix: Water
Comments: F177661 Sample received/analyzed beyond MBAS holding time

Report Date: 5/6/98
Date Arrived: 4/30/98
Sample Date: 4/26/98
Sample Time: 13:40
Collected By: WP

** Legend **
MRL = Method Report Level
MCL = Max. Contaminant Level
B = Present In Method Blank
E = Estimated Value
M = Matrix Interference
H = Above MCL
D = Lost To Dilution

Method	Parameter	Units	Result	MRL	Date Prepared	Date Analyzed
EPA 524.2						
	Benzene	ug/L	1.41	0.20		5/1/98
	Bromobenzene	ug/L	<MRL	0.20		
	Bromochloromethane	ug/L	<MRL	0.20		
	Bromodichloromethane	ug/L	<MRL	0.20		
	Bromoform	ug/L	<MRL	0.50		
	Bromomethane	ug/L	<MRL	1.00		
	n-Butylbenzene	ug/L	<MRL	0.20		
	sec-Butylbenzene	ug/L	<MRL	0.20		
	tert-Butylbenzene	ug/L	<MRL	0.20		
	Carbon Tetrachloride	ug/L	<MRL	0.20		
	Chlorobenzene	ug/L	<MRL	0.20		
	Chloroethane	ug/L	<MRL	1.00		
	Chloroform	ug/L	<MRL	0.30		
	Chloromethane	ug/L	<MRL	0.50		
	2-Chlorotoluene	ug/L	<MRL	0.20		
	4-Chlorotoluene	ug/L	<MRL	0.20		
	Dibromochloromethane	ug/L	<MRL	0.20		
	Dibromomethane	ug/L	<MRL	0.20		
	1,2-Dichlorobenzene	ug/L	<MRL	0.20		
	1,3-Dichlorobenzene	ug/L	<MRL	0.20		
	1,4-Dichlorobenzene	ug/L	<MRL	0.20		
	Dichlorodifluoromethane	ug/L	<MRL	0.50		
	1,1-Dichloroethane	ug/L	<MRL	0.20		

Reported By: Jorma K. Kuusisto
Chemistry Supervisor

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Michael Baker, Inc.
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Anchorage, AK 99503

Attn: Jim McGinnis

Client ID: 93-13
Client Project #:
Source:
NTL Lab#: A155019
Sample Matrix: Water
Comments: F177661 Sample received/analyzed beyond MBAS holding time

Report Date: 5/6/98
Date Arrived: 4/30/98
Sample Date: 4/26/98
Sample Time: 13:40
Collected By: WP

** Legend **
MRL = Method Report Level
MCL = Max. Contaminant Level
B = Present In Method Blank
E = Estimated Value
M = Matrix Interference
H = Above MCL
D = Lost To Dilution

Method	Parameter	Units	Result	MRL	Date Prepared	Date Analyzed
	1,2-Dichloroethane	ug/L	<MRL	0.20		5/1/98
	1,1-Dichloroethene	ug/L	<MRL	0.20		
	cis-1,2-Dichloroethene	ug/L	<MRL	0.20		
	trans-1,2-Dichloroethene	ug/L	<MRL	0.20		
	1,2-Dichloropropane	ug/L	<MRL	0.20		
	1,3-Dichloropropane	ug/L	<MRL	0.20		
	2,2-Dichloropropane	ug/L	<MRL	0.20		
	1,1-Dichloropropene	ug/L	<MRL	0.20		
	cis-1,3-Dichloropropene	ug/L	<MRL	0.20		
	trans-1,3-Dichloropropene	ug/L	<MRL	0.20		
	Ethylbenzene	ug/L	0.77	0.20		
	Hexachlorobutadiene	ug/L	<MRL	0.20		
	Isopropylbenzene	ug/L	<MRL	0.20		
	p-Isopropyltoluene	ug/L	<MRL	0.20		
	Methylene Chloride	ug/L	<MRL	0.50		
	Naphthalene	ug/L	<MRL	0.20		
	n-Propylbenzene	ug/L	<MRL	0.20		
	Styrene	ug/L	<MRL	0.20		
	1,1,1,2-Tetrachloroethane	ug/L	<MRL	0.20		
	1,1,2,2-Tetrachloroethane	ug/L	<MRL	0.20		
	Tetrachloroethene	ug/L	<MRL	0.20		
	Toluene	ug/L	6.53	0.20		
	1,2,3-Trichlorobenzene	ug/L	<MRL	0.20		
	1,2,4-Trichlorobenzene	ug/L	<MRL	0.20		

Reported By: Jorma K. Kuusisto
Chemistry Supervisor

NORTHERN TESTING LABORATORIES, INC.

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Michael Baker, Inc.
4601 Business Park Blvd., Ste. 42
Anchorage, AK 99503

Attn: Jim McGinnis

Client ID: 93-13
Client Project #:
Source:
NTL Lab#: A155019
Sample Matrix: Water
Comments: F177661 Sample received/analyzed beyond MBAS holding time

Report Date: 5/6/98
Date Arrived: 4/30/98
Sample Date: 4/26/98
Sample Time: 13:40
Collected By: WP

** Legend **
MRL = Method Report Level
MCL = Max. Contaminant Level
B = Present In Method Blank
E = Estimated Value
M = Matrix Interference
H = Above MCL
D = Lost To Dilution

Method	Parameter	Units	Result	MRL	Date Prepared	Date Analyzed
	1,1,1-Trichloroethane	ug/L	<MRL	0.20		5/1/98
	1,1,2-Trichloroethane	ug/L	<MRL	0.20		
	Trichloroethene	ug/L	<MRL	0.20		
	Trichlorofluoromethane	ug/L	<MRL	0.50		
	1,2,3-Trichloropropane	ug/L	<MRL	0.20		
	1,2,4-Trimethylbenzene	ug/L	0.48	0.20		
	1,3,5-Trimethylbenzene	ug/L	0.24	0.20		
	Vinyl Chloride	ug/L	<MRL	0.50		
	m,p-Xylene	ug/L	3.09	0.20		
	o-Xylene	ug/L	1.39	0.20		
	Total Trihalomethanes	ug/L	<MRL	0.50		
	BFB (Surr)	% Recovery	79			
	1,2-Dichlorobenzene-d4	% Recovery	79			
SM 5540 C						
	Foaming Agents (MBAS)	mg/L	<MRL	0.10		5/4/98

Reported By: Jorma K. Kuusisto
Chemistry Supervisor

NORTHERN TESTING LABORATORIES, INC.

3330 INDUSTRIAL AVENUE, FAIRBANKS, ALASKA 99701, (907) 456-3116 • FAX 456-3125
8005 SCHOON STREET, ANCHORAGE, ALASKA 99518, (907) 349-1000 • FAX 349-1016
POUCH 340043, PRUDHOE BAY, ALASKA 99734, (907) 659-2145 • FAX 659-2146

DRINKING WATER ANALYSIS REPORT FOR TOTAL COLIFORM BACTERIA

Michael Baker Jr., Inc.
4601 Business Park Blvd.; Ste. 42

Anchorage AK 99503

Date Received: 4/27/98 Time Received: 17:30
Date Analyzed: 4/28/98 Time Analyzed: 18:00
Date Reported: 5/1/98 Time Reported: 11:14
Next Sample Due:

Phone Number:

Fax Number:

Collected by: WP

Sample Type Special Purpose

Method of Analysis: MMO-MUG (SM 9223 B)

Comments:

Comments
S = Satisfactory
U = Unsatisfactory
POS = Positive Test Result
ND = None Detected
TNTC = Too Numerous To Count (>200 Colonies)
CG = Confluent Growth
HSM = Heavy Sediment Masking, Results May Not Be Reliable
SA = Sample Age >30 Hours But <48 Hours, Results May Not Be Reliable
Old = Sample Age >48 Hours, Too Old For Analysis
R = Resample Required
NT = No Test
* # Colonies/100 ml ** # Colonies/ml

Sample Date	Sample Time	Total* Coliform	E. Coli	Other* Bacteria	HPC** Result	Lab#	Location	Comments
4/26/98	13:40	ND	ND	NT	NT	AK2189	93-13	Satisfactory
4/26/98	14:40	ND	ND	NT	NT	AK2190	93-10	Satisfactory
4/26/98	11:46	ND	ND	NT	NT	AK2191	93-15	Satisfactory
4/26/98	14:10	ND	ND	NT	NT	AK2192	93-12	Satisfactory
4/26/98	12:36	ND	ND	NT	NT	AK2193	93-21	Satisfactory
4/26/98	13:00	ND	ND	NT	NT	AK2194	93-22	Satisfactory
4/26/98	15:10	ND	ND	NT	NT	AK2195	92-82	Satisfactory

Marian Ruth

Marian Ruth Environmental Analyst 5/4/98
Northern Testing Laboratories, Inc Fairbanks, AK

NORTHERN TESTING LABORATORIES, INC.

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Michael Baker, Jr. Inc.
4601 Business Park Blvd.; Ste 42
Anchorage AK 99503

Attn: Jim McGinnis, PE

Report Date: 06/10/98

Date Arrived: 04/29/98
Date Sampled: 04/26/98
Time Sampled: 1340
Collected By: WP

MRL = Method Reporting Limit

* Flag Definitions
B = Below Regulatory Min.
H = Above Regulatory Max.

Our Lab #: F177668
Location/Project: Alpine Camp Water System
Your Sample ID: 93-13
Sample Matrix: Water
Comments:

Lab#	Method	Parameter	Units	Results *	MRL	Digest Prepared	Date Analyzed
F177668	EPA 900.0	Gross Alpha	pCi/L	ND@1+/-0.34			05/28/98

Reported By: Cindy L. Christian
Laboratory Director

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Michael Baker, Jr. Inc.
4601 Business Park Blvd.; Ste 42
Anchorage AK 99503

Attn: Jim McGinnis, PE

Report Date: 05/31/98

Date Arrived: 05/14/98
Date Sampled: 05/11/98
Time Sampled: 1445
Collected By: -

MRL = Method Reporting Limit

Our Lab #: F178037
Location/Project: Alpine Camp Water System
Your Sample ID: 93-13
Sample Matrix: Water
Comments:

* Flag Definitions
B = Below Regulatory Min.
H = Above Regulatory Max.

Lab#	Method	Parameter	Units	Results *	MRL	Digest Prepared	Date Analyzed
F178037	EPA 200.7	Aluminum	mg/L	<MRL	0.055		05/19/98
		Barium	mg/L	0.202	0.002		05/19/98
		Beryllium	mg/L	<MRL	0.0005		05/19/98
		Calcium	mg/L	23.3	0.016		05/19/98
		Copper	mg/L	<MRL	0.008		05/19/98
		Iron	mg/L	0.182	0.010		05/19/98
		Hardness as CaCO3	mg/L	96.7	0.1		05/19/98
		Magnesium	mg/L	9.33	0.073		05/19/98
		Manganese	mg/L	0.019	0.003		05/19/98
		Sodium	mg/L	23.7	0.120		05/19/98
		Nickel	mg/L	<MRL	0.028		05/19/98
		Zinc	mg/L	0.008	0.008		05/19/98
	EPA 200.9	Silver	mg/L	<MRL	0.0001		05/27/98
		Arsenic	mg/L	<MRL	0.003		05/18/98
		Cadmium	mg/L	0.0001	0.0001		05/22/98
		Chromium	mg/L	<MRL	0.002		05/27/98
		Antimony	mg/L	<MRL	0.003		05/28/98
		Selenium	mg/L	<MRL	0.003		05/19/98
		Thallium	mg/L	<MRL	0.001		05/15/98
	EPA 245.1	Mercury	mg/L	<MRL	0.0002		05/19/98
	EPA 300.0	Chloride	mg/L	41.8	2.80		05/18/98
		Fluoride	mg/L	0.09	0.04		05/14/98
		Nitrate-N	mg/L	0.07	0.03		05/14/98
		Sulfate	mg/L	2.29	0.20		05/14/98

Reported By: Cindy L. Christian
Laboratory Director

NORTHERN TESTING LABORATORIES, INC.

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POUCH 340043 PRUDHOE BAY, ALASKA 99734 (907) 659-2145 • FAX 659-2146

Lab#	Method	Parameter	Units	Results *	MRL	Digest Prepared	Date Analyzed
F178037	SM2120-B	Color, Apparent	Unit	10	5		05/14/98
	SM2130-B	Turbidity	NTU	1	0.05		05/14/98
	SM2150-B	Odor	TON	8 H	1		05/14/98
	SM2320-B	Alkalinity as CaCO3	mg/L	81	5		05/14/98
		Bicarbonate Alkalinity (as CaCO3)	mg/L	81	1		05/14/98
	SM2330-B	Langelier Index	Unit	-0.7			05/22/98
	SM2540-C	Total Dissolved Solids	mg/L	177	25		05/19/98
	SM4500-CN -E	Total Cyanide	mg/L	<MRL	0.02		05/18/98
	SM4500-H- B	pH	Unit	7.6			05/14/98

Cindy L. Christian

Reported By: Cindy L. Christian
Laboratory Director

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Michael Baker, Inc.
4601 Business Park Blvd., Ste. 42
Anchorage, AK 99503

Attn: Jim McGinnis

Client ID: 93-13 (F178037)
Client Project #: 2270
Source:
NTL Lab#: A155279
Sample Matrix: Water
Comments:

Report Date: 5/29/98
Date Arrived: 5/15/98
Sample Date: 5/11/98
Sample Time: 14:45
Collected By:

** Legend **

MRL = Method Report Level
MCL = Max. Contaminant Level
B = Present In Method Blank
E = Estimated Value
M = Matrix Interference
H = Above MCL
D = Lost To Dilution

Method	Parameter	Units	Result	MRL	Date Prepared	Date Analyzed
EPA 524.2						
	Benzene	ug/L	2.13	0.20		5/21/98
	Bromobenzene	ug/L	<MRL	0.20		
	Bromochloromethane	ug/L	<MRL	0.20		
	Bromodichloromethane	ug/L	<MRL	0.20		
	Bromoform	ug/L	<MRL	0.50		
	Bromomethane	ug/L	<MRL	1.00		
	n-Butylbenzene	ug/L	0.25	0.20		
	sec-Butylbenzene	ug/L	0.24	0.20		
	tert-Butylbenzene	ug/L	<MRL	0.20		
	Carbon Tetrachloride	ug/L	<MRL	0.20		
	Chlorobenzene	ug/L	<MRL	0.20		
	Chloroethane	ug/L	<MRL	1.00		
	Chloroform	ug/L	<MRL	0.30		
	Chloromethane	ug/L	<MRL	0.50		
	2-Chlorotoluene	ug/L	<MRL	0.20		
	4-Chlorotoluene	ug/L	<MRL	0.20		
	Dibromochloromethane	ug/L	<MRL	0.20		
	Dibromomethane	ug/L	<MRL	0.20		
	1,2-Dichlorobenzene	ug/L	<MRL	0.20		
	1,3-Dichlorobenzene	ug/L	<MRL	0.20		
	1,4-Dichlorobenzene	ug/L	<MRL	0.20		
	Dichlorodifluoromethane	ug/L	<MRL	0.50		
	1,1-Dichloroethane	ug/L	<MRL	0.20		

Reported By: Jorma K. Kuusisto
Chemistry Supervisor

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Michael Baker, Inc.
4601 Business Park Blvd., Ste. 42
Anchorage, AK 99503

Attn: Jim McGinnis

Client ID: 93-13 (F178037)
Client Project #: 2270
Source:
NTL Lab#: A155279
Sample Matrix: Water
Comments:

Report Date: 5/29/98
Date Arrived: 5/15/98
Sample Date: 5/11/98
Sample Time: 14:45
Collected By:

** Legend **
MRL = Method Report Level
MCL = Max. Contaminant Level
B = Present In Method Blank
E = Estimated Value
M = Matrix Interference
H = Above MCL
D = Lost To Dilution

Method	Parameter	Units	Result	MRL	Date Prepared	Date Analyzed
	1,2-Dichloroethane	ug/L	<MRL	0.20		5/21/98
	1,1-Dichloroethene	ug/L	<MRL	0.20		
	cis-1,2-Dichloroethene	ug/L	<MRL	0.20		
	trans-1,2-Dichloroethene	ug/L	<MRL	0.20		
	1,2-Dichloropropane	ug/L	<MRL	0.20		
	1,3-Dichloropropane	ug/L	<MRL	0.20		
	2,2-Dichloropropane	ug/L	<MRL	0.20		
	1,1-Dichloropropene	ug/L	<MRL	0.20		
	cis-1,3-Dichloropropene	ug/L	<MRL	0.20		
	trans-1,3-Dichloropropene	ug/L	<MRL	0.20		
	Ethylbenzene	ug/L	3.70	0.20		
	Hexachlorobutadiene	ug/L	<MRL	0.20		
	Isopropylbenzene	ug/L	0.72	0.20		
	p-Isopropyltoluene	ug/L	0.31	0.20		
	Methylene Chloride	ug/L	<MRL	0.50		
	Naphthalene	ug/L	<MRL	0.20		
	n-Propylbenzene	ug/L	1.23	0.20		
	Styrene	ug/L	<MRL	0.20		
	1,1,1,2-Tetrachloroethane	ug/L	<MRL	0.20		
	1,1,2,2-Tetrachloroethane	ug/L	<MRL	0.20		
	Tetrachloroethene	ug/L	<MRL	0.20		
	Toluene	ug/L	18.6	0.20		
	1,2,3-Trichlorobenzene	ug/L	<MRL	0.20		
	1,2,4-Trichlorobenzene	ug/L	<MRL	0.20		

Reported By: Jorma K. Kuusisto
Chemistry Supervisor

NORTHERN TESTING LABORATORIES, INC.

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Michael Baker, Inc.
4601 Business Park Blvd., Ste. 42
Anchorage, AK 99503

Attn: Jim McGinnis

Client ID: 93-13 (F178037)
Client Project #: 2270
Source:
NTL Lab#: A155279
Sample Matrix: Water
Comments:

Report Date: 5/29/98
Date Arrived: 5/15/98
Sample Date: 5/11/98
Sample Time: 14:45
Collected By:

** Legend **
MRL = Method Report Level
MCL = Max. Contaminant Level
B = Present In Method Blank
E = Estimated Value
M = Matrix Interference
H = Above MCL
D = Lost To Dilution

Method	Parameter	Units	Result	MRL	Date Prepared	Date Analyzed
	1,1,1-Trichloroethane	ug/L	<MRL	0.20		5/21/98
	1,1,2-Trichloroethane	ug/L	<MRL	0.20		
	Trichloroethene	ug/L	<MRL	0.20		
	Trichlorofluoromethane	ug/L	<MRL	0.50		
	1,2,3-Trichloropropane	ug/L	<MRL	0.20		
	1,2,4-Trimethylbenzene	ug/L	3.02	0.20		
	1,3,5-Trimethylbenzene	ug/L	1.81	0.20		
	Vinyl Chloride	ug/L	<MRL	0.50		
	m,p-Xylene	ug/L	14.4	0.20		
	o-Xylene	ug/L	6.83	0.20		
	Total Trihalomethanes	ug/L	<MRL	0.50		
	4-Bromofluorobenzene	% Recovery	96			
	1,2-Dichlorobenzene-d4	% Recovery	90			
SM 5540 C						
	Foaming Agents (MBAS)	mg/L	<MRL	0.10		5/28/98

Reported By: Jorma K. Kuusisto
Chemistry Supervisor

NORTHERN TESTING LABORATORIES, INC.

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POUCH 340043 PRUDHOE BAY, ALASKA 99734 (907) 659-2145 • FAX 659-2146

Report Date: 14 May 98 Report No.: 98050015

Report of Analysis

Northern Testing Laboratories
3330 Industrial Avenue
Fairbanks, AK 99701
(907)456-3116

Field ID Number	93-13
Sample Description	Lake Sampling
Date/Time Sampled	05/11/98 @14:45
Date/Time Received	05/12/98 @14:55 by JEP
NTL Lab Number	NT03219

Analyte	Result	Units	MDL	Method	Preparation Date	Analysis Date	Analyst
Total Coliform by Colilert	Not detected	CFU/100ml		SM 9223B	05/13/98	05/14/98	JEP

Approved by: Jerry Pollen
Don Cook / Jerry Pollen
Chemist / Lab Tech

NORTHERN TESTING LABORATORIES, INC.

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Michael Baker, Jr. Inc.
4601 Business Park Blvd.; Ste 42
Anchorage AK 99503

Attn: Jim McGinnis, PE

Report Date: 07/22/98

Date Arrived: 05/14/98
Date Sampled: 05/11/98
Time Sampled: 1445
Collected By: -

MRL = Method Reporting Limit

Our Lab #: F178044
Location/Project: Alpine Camp Water System
Your Sample ID: 93-13
Sample Matrix: Water
Comments:

* Flag Definitions
B = Below Regulatory Min.
H = Above Regulatory Max.

Lab#	Method	Parameter	Units	Results *	MRL	Digest Prepared	Date Analyzed
F178044	EPA 900.0	Gross Alpha	pCi/L	ND@1+/-0.36			07/08/98

Reported By: Cindy L. Christian
Laboratory Director

NORTHERN TESTING LABORATORIES, INC.

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Michael Baker, Jr. Inc.
4601 Business Park Blvd.; Ste 42
Anchorage AK 99503

Attn: Jim McGinnis, PE

Report Date: 08/04/98

Date Arrived: 07/21/98
Date Sampled: 07/17/98
Time Sampled: -
Collected By: -

MRL = Method Reporting Limit

* Flag Definitions
B = Below Regulatory Min.
H = Above Regulatory Max.

Our Lab #: F179227
Location/Project: Alpine Camp Water System
Your Sample ID: 93-13
Sample Matrix: Water
Comments:

Lab#	Method	Parameter	Units	Results *	MRL	Digest Prepared	Date Analyzed
F179227	EPA 200.7	Aluminum	ug/L	<MRL	15		07/24/98
		Barium	ug/L	63.1	0.6		07/24/98
		Beryllium	ug/L	<MRL	0.6		07/24/98
		Calcium	ug/L	8190	10		07/24/98
		Chromium	ug/L	<MRL	3		07/24/98
		Copper	ug/L	<MRL	3		07/24/98
		Iron	ug/L	83	5		07/24/98
		Hardness as CaCO3	mg/L	36.3	0.2		07/24/98
		Magnesium	ug/L	<MRL	45		07/24/98
		Manganese	ug/L	8	3		07/24/98
		Sodium	ug/L	13400	27		07/24/98
		Nickel	ug/L	<MRL	5		07/24/98
		Zinc	ug/L	<MRL	3		07/24/98
	EPA 200.9	Silver	ug/L	<MRL	0.1		07/30/98
		Arsenic	ug/L	<MRL	4		07/27/98
		Cadmium	ug/L	<MRL	0.1		07/23/98
		Antimony	ug/L	<MRL	3		07/31/98
		Selenium	ug/L	<MRL	4		07/31/98
		Thallium	ug/L	<MRL	1		07/31/98
	EPA 245.1	Mercury	ug/L	<MRL	0.2		07/27/98
	EPA 300.0	Chloride	mg/L	27.2	0.80		07/22/98
		Fluoride	mg/L	<MRL	0.06		07/22/98
		Nitrate-N	mg/L	<MRL	0.03		07/22/98
		Sulfate	mg/L	2.9	0.2		07/22/98

Reported By: Cindy L. Christian
Laboratory Director

NORTHERN TESTING LABORATORIES, INC.

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POUCH 340043 PRUDHOE BAY, ALASKA 99734 (907) 659-2145 • FAX 659-2146

Lab#	Method	Parameter	Units	Results *	MRL	Digest Prepared	Date Analyzed
F179227	SM2120-B	Color, Apparent	Unit	10	5		07/21/98
	SM2130-B	Turbidity	NTU	0.55	0.05		07/21/98
	SM2150-B	Odor	TON	2	1		07/21/98
	SM2320-B	Alkalinity as CaCO3	mg/L	30	15		07/22/98
		Bicarbonate Alkalinity (as CaCO3)	mg/L	30	15		07/22/98
	SM2330-B	Langelier Index	Unit	-0.4			07/29/98
	SM2540-C	Total Dissolved Solids	mg/L	76	35		07/21/98
	SM4500-CN -E	Total Cyanide	mg/L	<MRL	0.02		07/24/98
	SM4500-H- B	pH	Unit	7.7			07/21/98

Cindy L. Christian

Reported By: Cindy L. Christian
Laboratory Director

NORTHERN TESTING LABORATORIES, INC.

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Michael Baker, Inc.
4601 Business Park Blvd., Ste. 42
Anchorage, AK 99503

Attn: Jim McGinnis

Client ID: 93-13
Client Project #:
Source:
NTL Lab#: A156499
Sample Matrix: Water
Comments:

Report Date: 7/27/98
Date Arrived: 7/20/98
Sample Date: 7/17/98
Sample Time:
Collected By:

** Legend **
MRL = Method Report Level
MCL = Max. Contaminant Level
B = Present In Method Blank
E = Estimated Value
M = Matrix Interference
H = Above MCL
D = Lost To Dilution

Method	Parameter	Units	Result	MRL	Date Prepared	Date Analyzed
EPA 524.2						
	Benzene	ug/L	<MRL	0.20		7/22/98
	Bromobenzene	ug/L	<MRL	0.20		
	Bromochloromethane	ug/L	<MRL	0.20		
	Bromodichloromethane	ug/L	<MRL	0.20		
	Bromoform	ug/L	<MRL	0.50		
	Bromomethane	ug/L	<MRL	1.00		
	n-Butylbenzene	ug/L	<MRL	0.20		
	sec-Butylbenzene	ug/L	<MRL	0.20		
	tert-Butylbenzene	ug/L	<MRL	0.20		
	Carbon Tetrachloride	ug/L	<MRL	0.20		
	Chlorobenzene	ug/L	<MRL	0.20		
	Chloroethane	ug/L	<MRL	1.00		
	Chloroform	ug/L	<MRL	0.30		
	Chloromethane	ug/L	<MRL	0.50		
	2-Chlorotoluene	ug/L	<MRL	0.20		
	4-Chlorotoluene	ug/L	<MRL	0.20		
	Dibromochloromethane	ug/L	<MRL	0.20		
	Dibromomethane	ug/L	<MRL	0.20		
	1,2-Dichlorobenzene	ug/L	<MRL	0.20		
	1,3-Dichlorobenzene	ug/L	<MRL	0.20		
	1,4-Dichlorobenzene	ug/L	<MRL	0.20		
	Dichlorodifluoromethane	ug/L	<MRL	0.50		
	1,1-Dichloroethane	ug/L	<MRL	0.20		

Reported By: Jorma K. Kuusisto
Chemistry Supervisor

NORTHERN TESTING LABORATORIES, INC.

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Michael Baker, Inc.
4601 Business Park Blvd., Ste. 42
Anchorage, AK 99503

Attn: Jim McGinnis

Client ID: 93-13
Client Project #:
Source:
NTL Lab#: A156499
Sample Matrix: Water
Comments:

Report Date: 7/27/98
Date Arrived: 7/20/98
Sample Date: 7/17/98
Sample Time:
Collected By:

** Legend **
MRL = Method Report Level
MCL = Max. Contaminant Level
B = Present In Method Blank
E = Estimated Value
M = Matrix Interference
H = Above MCL
D = Lost To Dilution

Method	Parameter	Units	Result	MRL	Date Prepared	Date Analyzed
	1,2-Dichloroethane	ug/L	<MRL	0.20		7/22/98
	1,1-Dichloroethene	ug/L	<MRL	0.20		
	cis-1,2-Dichloroethene	ug/L	<MRL	0.20		
	trans-1,2-Dichloroethene	ug/L	<MRL	0.20		
	1,2-Dichloropropane	ug/L	<MRL	0.20		
	1,3-Dichloropropane	ug/L	<MRL	0.20		
	2,2-Dichloropropane	ug/L	<MRL	0.20		
	1,1-Dichloropropene	ug/L	<MRL	0.20		
	cis-1,3-Dichloropropene	ug/L	<MRL	0.20		
	trans-1,3-Dichloropropene	ug/L	<MRL	0.20		
	Ethylbenzene	ug/L	<MRL	0.20		
	Hexachlorobutadiene	ug/L	<MRL	0.20		
	Isopropylbenzene	ug/L	<MRL	0.20		
	p-Isopropyltoluene	ug/L	<MRL	0.20		
	Methylene Chloride	ug/L	<MRL	0.50		
	Naphthalene	ug/L	<MRL	0.20		
	n-Propylbenzene	ug/L	<MRL	0.20		
	Styrene	ug/L	<MRL	0.20		
	1,1,1,2-Tetrachloroethane	ug/L	<MRL	0.20		
	1,1,2,2-Tetrachloroethane	ug/L	<MRL	0.20		
	Tetrachloroethene	ug/L	<MRL	0.20		
	Toluene	ug/L	<MRL	0.20		
	1,2,3-Trichlorobenzene	ug/L	<MRL	0.20		
	1,2,4-Trichlorobenzene	ug/L	<MRL	0.20		

Reported By: Jorma K. Kuusisto
Chemistry Supervisor

NORTHERN TESTING LABORATORIES, INC.

3330 INDUSTRIAL AVENUE · FAIRBANKS, ALASKA 99701 · (907) 456-3116 • FAX 456-3125
8005 SCHOON STREET · ANCHORAGE, ALASKA 99518 · (907) 349-1000 • FAX 349-1016
POUCH 340043 · PRUDHOE BAY, ALASKA 99734 · (907) 659-2145 • FAX 659-2146

Michael Baker, Inc.
4601 Business Park Blvd., Ste. 42
Anchorage, AK 99503

Attn: Jim McGinnis

Client ID: 93-13
Client Project #:
Source:
NTL Lab#: A156499
Sample Matrix: Water
Comments:

Report Date: 7/27/98
Date Arrived: 7/20/98
Sample Date: 7/17/98
Sample Time:
Collected By:

** Legend **
MRL = Method Report Level
MCL = Max. Contaminant Level
B = Present In Method Blank
E = Estimated Value
M = Matrix Interference
H = Above MCL
D = Lost To Dilution

Method	Parameter	Units	Result	MRL	Date Prepared	Date Analyzed
	1,1,1-Trichloroethane	ug/L	<MRL	0.20		7/22/98
	1,1,2-Trichloroethane	ug/L	<MRL	0.20		
	Trichloroethene	ug/L	<MRL	0.20		
	Trichlorofluoromethane	ug/L	<MRL	0.50		
	1,2,3-Trichloropropane	ug/L	<MRL	0.20		
	1,2,4-Trimethylbenzene	ug/L	<MRL	0.20		
	1,3,5-Trimethylbenzene	ug/L	<MRL	0.20		
	Vinyl Chloride	ug/L	<MRL	0.50		
	m,p-Xylene	ug/L	<MRL	0.20		
	o-Xylene	ug/L	<MRL	0.20		
	Total Trihalomethanes	ug/L	<MRL	0.50		
	4-Bromofluorobenzene	% Recovery	88			
	1,2-Dichlorobenzene-d4	% Recovery	82			
SM 5540 C						
	Foaming Agents (MBAS)	mg/L	<MRL	0.10		7/22/98

Reported By: Jorma K. Kuusisto
Chemistry Supervisor

NORTHERN TESTING LABORATORIES, INC.

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POUCH 340043 · PRUDHOE BAY, ALASKA 99734 · (907) 659-2145 • FAX 659-2146

Michael Baker, Inc.
4601 Business Park Blvd., Ste. 42
Anchorage, AK 99503

Attn: Jim McGinnis

Client ID: Travel Blank
Client Project #:
Source:
NTL Lab#: A156500
Sample Matrix: Water
Comments:

Report Date: 7/27/98
Date Arrived: 7/20/98
Sample Date: 7/17/98
Sample Time:
Collected By:

** Legend **
MRL = Method Report Level
MCL = Max. Contaminant Level
B = Present In Method Blank
E = Estimated Value
M = Matrix Interference
H = Above MCL
D = Lost To Dilution

Method	Parameter	Units	Result	MRL	Date Prepared	Date Analyzed
EPA 524.2						
	Benzene	ug/L	<MRL	0.20		7/22/98
	Bromobenzene	ug/L	<MRL	0.20		
	Bromochloromethane	ug/L	<MRL	0.20		
	Bromodichloromethane	ug/L	<MRL	0.20		
	Bromoform	ug/L	<MRL	0.50		
	Bromomethane	ug/L	<MRL	1.00		
	n-Butylbenzene	ug/L	<MRL	0.20		
	sec-Butylbenzene	ug/L	<MRL	0.20		
	tert-Butylbenzene	ug/L	<MRL	0.20		
	Carbon Tetrachloride	ug/L	<MRL	0.20		
	Chlorobenzene	ug/L	<MRL	0.20		
	Chloroethane	ug/L	<MRL	1.00		
	Chloroform	ug/L	<MRL	0.30		
	Chloromethane	ug/L	<MRL	0.50		
	2-Chlorotoluene	ug/L	<MRL	0.20		
	4-Chlorotoluene	ug/L	<MRL	0.20		
	Dibromochloromethane	ug/L	<MRL	0.20		
	Dibromomethane	ug/L	<MRL	0.20		
	1,2-Dichlorobenzene	ug/L	<MRL	0.20		
	1,3-Dichlorobenzene	ug/L	<MRL	0.20		
	1,4-Dichlorobenzene	ug/L	<MRL	0.20		
	Dichlorodifluoromethane	ug/L	<MRL	0.50		
	1,1-Dichloroethane	ug/L	<MRL	0.20		

Reported By: Jorma K. Kuusisto
Chemistry Supervisor

NORTHERN TESTING LABORATORIES, INC.

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Michael Baker, Inc.
4601 Business Park Blvd., Ste. 42
Anchorage, AK 99503

Attn: Jim McGinnis

Client ID: Travel Blank
Client Project #:
Source:
NTL Lab#: A156500
Sample Matrix: Water
Comments:

Report Date: 7/27/98
Date Arrived: 7/20/98
Sample Date: 7/17/98
Sample Time:
Collected By:

** Legend **
MRL = Method Report Level
MCL = Max. Contaminant Level
B = Present In Method Blank
E = Estimated Value
M = Matrix Interference
H = Above MCL
D = Lost To Dilution

Method	Parameter	Units	Result	MRL	Date Prepared	Date Analyzed
	1,2-Dichloroethane	ug/L	<MRL	0.20		7/22/98
	1,1-Dichloroethene	ug/L	<MRL	0.20		
	cis-1,2-Dichloroethene	ug/L	<MRL	0.20		
	trans-1,2-Dichloroethene	ug/L	<MRL	0.20		
	1,2-Dichloropropane	ug/L	<MRL	0.20		
	1,3-Dichloropropane	ug/L	<MRL	0.20		
	2,2-Dichloropropane	ug/L	<MRL	0.20		
	1,1-Dichloropropene	ug/L	<MRL	0.20		
	cis-1,3-Dichloropropene	ug/L	<MRL	0.20		
	trans-1,3-Dichloropropene	ug/L	<MRL	0.20		
	Ethylbenzene	ug/L	<MRL	0.20		
	Hexachlorobutadiene	ug/L	<MRL	0.20		
	Isopropylbenzene	ug/L	<MRL	0.20		
	p-Isopropyltoluene	ug/L	<MRL	0.20		
	Methylene Chloride	ug/L	<MRL	0.50		
	Naphthalene	ug/L	<MRL	0.20		
	n-Propylbenzene	ug/L	<MRL	0.20		
	Styrene	ug/L	<MRL	0.20		
	1,1,1,2-Tetrachloroethane	ug/L	<MRL	0.20		
	1,1,2,2-Tetrachloroethane	ug/L	<MRL	0.20		
	Tetrachloroethene	ug/L	<MRL	0.20		
	Toluene	ug/L	<MRL	0.20		
	1,2,3-Trichlorobenzene	ug/L	<MRL	0.20		
	1,2,4-Trichlorobenzene	ug/L	<MRL	0.20		

Reported By: Jorma K. Kuusisto
Chemistry Supervisor

NORTHERN TESTING LABORATORIES, INC.

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POUCH 340043 PRUDHOE BAY, ALASKA 99734 (907) 659-2145 • FAX 659-2146

Michael Baker, Inc.
4601 Business Park Blvd., Ste. 42
Anchorage, AK 99503

Attn: Jim McGinnis

Client ID: Travel Blank
Client Project #:
Source:
NTL Lab#: A156500
Sample Matrix: Water
Comments:

Report Date: 7/27/98
Date Arrived: 7/20/98
Sample Date: 7/17/98
Sample Time:
Collected By:

** Legend **
MRL = Method Report Level
MCL = Max. Contaminant Level
B = Present In Method Blank
E = Estimated Value
M = Matrix Interference
H = Above MCL
D = Lost To Dilution

Method	Parameter	Units	Result	MRL	Date Prepared	Date Analyzed
	1,1,1-Trichloroethane	ug/L	<MRL	0.20		7/22/98
	1,1,2-Trichloroethane	ug/L	<MRL	0.20		
	Trichloroethene	ug/L	<MRL	0.20		
	Trichlorofluoromethane	ug/L	<MRL	0.50		
	1,2,3-Trichloropropane	ug/L	<MRL	0.20		
	1,2,4-Trimethylbenzene	ug/L	<MRL	0.20		
	1,3,5-Trimethylbenzene	ug/L	<MRL	0.20		
	Vinyl Chloride	ug/L	<MRL	0.50		
	m,p-Xylene	ug/L	<MRL	0.20		
	o-Xylene	ug/L	<MRL	0.20		
	Total Trihalomethanes	ug/L	<MRL	0.50		
	4-Bromofluorobenzene	% Recovery	89			
	1,2-Dichlorobenzene-d4	% Recovery	81			

Reported By: Jorma K. Kuusisto
Chemistry Supervisor

NORTHERN TESTING LABORATORIES, INC.

3330 INDUSTRIAL AVENUE
8005 SCHOON STREET
POUCH 340043

FAIRBANKS, ALASKA 99701
ANCHORAGE, ALASKA 99518
PRUDHOE BAY, ALASKA 99734

(907) 456-3116 • FAX 456-3125
(907) 349-1000 • FAX 349-1016
(907) 659-2145 • FAX 659-2146

Michael Baker, Jr. Inc.
4601 Business Park Blvd.; Ste 42
Anchorage AK 99503

Attn: Jim McGinnis, PE

Report Date: 08/28/98

Date Arrived: 08/19/98
Date Sampled: 08/18/98
Time Sampled: 1200
Collected By: -

MRL = Method Reporting Limit

* Flag Definitions
B = Below Regulatory Min.
H = Above Regulatory Max.

Our Lab #: F179862
Location/Project: Alpine Camp Water System
Your Sample ID: 93-13
Sample Matrix: Water
Comments:

Lab#	Method	Parameter	Units	Results *	MRL	Digest Prepared	Date Analyzed
F179862	EPA 200.7	Aluminum	mg/L	<MRL	0.02		08/20/98
		Barium	mg/L	0.0734	0.0006		08/20/98
		Beryllium	mg/L	<MRL	0.0006		08/20/98
		Calcium	mg/L	9.25	0.01		08/20/98
		Chromium	mg/L	<MRL	0.003		08/20/98
		Copper	mg/L	<MRL	0.003		08/20/98
		Iron	mg/L	0.089	0.005		08/20/98
		Hardness as CaCO3	mg/L	42.6	0.2		08/20/98
		Magnesium	mg/L	4.74	0.05		08/20/98
		Manganese	mg/L	0.022	0.003		08/20/98
		Sodium	mg/L	14.3	0.03		08/20/98
		Nickel	mg/L	<MRL	0.005		08/20/98
		Zinc	mg/L	0.156	0.003		08/20/98
	EPA 200.9	Silver	mg/L	<MRL	0.0001		08/20/98
		Arsenic	mg/L	<MRL	0.004		08/25/98
		Cadmium	mg/L	<MRL	0.0001		08/26/98
		Antimony	mg/L	<MRL	0.003		08/21/98
		Selenium	mg/L	<MRL	0.004		08/26/98
		Thallium	mg/L	<MRL	0.001		08/26/98
	EPA 245.1	Mercury	mg/L	<MRL	0.0002		08/20/98
	EPA 300.0	Chloride	mg/L	27.5	0.80		08/19/98
		Fluoride	mg/L	<MRL	0.06		08/19/98
		Nitrate-N	mg/L	<MRL	0.03		08/19/98
		Sulfate	mg/L	2.6	0.2		08/19/98

Cindy L. Christian

Reported By: Cindy L. Christian
Laboratory Director

NORTHERN TESTING LABORATORIES, INC.

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POUCH 340043 — PRUDHOE BAY, ALASKA 99734 — (907) 659-2145 • FAX 659-2146

Lab#	Method	Parameter	Units	Results *	MRL	Digest Prepared	Date Analyzed
F179862	SM2120-B	Color, Apparent	Unit	10	5		08/19/98
	SM2130-B	Turbidity	NTU	0.70	0.05		08/19/98
	SM2150-B	Odor	TON	2	1		08/19/98
	SM2320-B	Alkalinity as CaCO3	mg/L	34	15		08/20/98
		Bicarbonate Alkalinity (as CaCO3)	mg/L	34	15		08/20/98
	SM2330-B	Langelier Index	Unit	-1.3			08/25/98
	SM2540-C	Total Dissolved Solids	mg/L	90	35		08/20/98
	SM4500-CN -E	Total Cyanide	mg/L	<MRL	0.02		08/24/98
	SM4500-H- B	pH	Unit	7.7			08/19/98

Reported By: Cindy L. Christian
Laboratory Director

NORTHERN TESTING LABORATORIES, INC.

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POUCH 340043, PRUDHOE BAY, ALASKA 99734, (907) 659-2145 • FAX 659-2146

Michael Baker, Inc.
4601 Business Park Blvd., Ste. 42
Anchorage, AK 99503

Attn: Jim McGinnis

Client ID: 93-13
Client Project #:
Source:
NTL Lab#: A157249
Sample Matrix: Water
Comments: F179862

Report Date: 8/28/98
Date Arrived: 8/20/98
Sample Date: 8/18/98
Sample Time: 12:00
Collected By:

** Legend **

MRL = Method Report Level
MCL = Max. Contaminant Level
B = Present In Method Blank
E = Estimated Value
M = Matrix Interference
H = Above MCL
D = Lost To Dilution

Method	Parameter	Units	Result	MRL	Date Prepared	Date Analyzed
EPA 524.2						
	Benzene	ug/L	<MRL	0.20		8/24/98
	Bromobenzene	ug/L	<MRL	0.20		
	Bromochloromethane	ug/L	<MRL	0.20		
	Bromodichloromethane	ug/L	<MRL	0.20		
	Bromoform	ug/L	<MRL	0.50		
	Bromomethane	ug/L	<MRL	1.00		
	n-Butylbenzene	ug/L	<MRL	0.20		
	sec-Butylbenzene	ug/L	<MRL	0.20		
	tert-Butylbenzene	ug/L	<MRL	0.20		
	Carbon Tetrachloride	ug/L	<MRL	0.20		
	Chlorobenzene	ug/L	<MRL	0.20		
	Chloroethane	ug/L	<MRL	1.00		
	Chloroform	ug/L	<MRL	0.30		
	Chloromethane	ug/L	<MRL	0.50		
	2-Chlorotoluene	ug/L	<MRL	0.20		
	4-Chlorotoluene	ug/L	<MRL	0.20		
	Dibromochloromethane	ug/L	<MRL	0.20		
	Dibromomethane	ug/L	<MRL	0.20		
	1,2-Dichlorobenzene	ug/L	<MRL	0.20		
	1,3-Dichlorobenzene	ug/L	<MRL	0.20		
	1,4-Dichlorobenzene	ug/L	<MRL	0.20		
	Dichlorodifluoromethane	ug/L	<MRL	0.50		
	1,1-Dichloroethane	ug/L	<MRL	0.20		

Reported By: Jorma K. Kuusisto
Chemistry Supervisor

NORTHERN TESTING LABORATORIES, INC.

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Michael Baker, Inc.
4601 Business Park Blvd., Ste. 42
Anchorage, AK 99503

Attn: Jim McGinnis

Client ID: 93-13
Client Project #:
Source:
NTL Lab#: A157249
Sample Matrix: Water
Comments: F179862

Report Date: 8/28/98
Date Arrived: 8/20/98
Sample Date: 8/18/98
Sample Time: 12:00
Collected By:

** Legend **
MRL = Method Report Level
MCL = Max. Contaminant Level
B = Present In Method Blank
E = Estimated Value
M = Matrix Interference
H = Above MCL
D = Lost To Dilution

Method	Parameter	Units	Result	MRL	Date Prepared	Date Analyzed
	1,2-Dichloroethane	ug/L	<MRL	0.20		8/24/98
	1,1-Dichloroethene	ug/L	<MRL	0.20		
	cis-1,2-Dichloroethene	ug/L	<MRL	0.20		
	trans-1,2-Dichloroethene	ug/L	<MRL	0.20		
	1,2-Dichloropropane	ug/L	<MRL	0.20		
	1,3-Dichloropropane	ug/L	<MRL	0.20		
	2,2-Dichloropropane	ug/L	<MRL	0.20		
	1,1-Dichloropropene	ug/L	<MRL	0.20		
	cis-1,3-Dichloropropene	ug/L	<MRL	0.20		
	trans-1,3-Dichloropropene	ug/L	<MRL	0.20		
	Ethylbenzene	ug/L	<MRL	0.20		
	Hexachlorobutadiene	ug/L	<MRL	0.20		
	Isopropylbenzene	ug/L	<MRL	0.20		
	p-Isopropyltoluene	ug/L	<MRL	0.20		
	Methylene Chloride	ug/L	<MRL	0.50		
	Naphthalene	ug/L	<MRL	0.20		
	n-Propylbenzene	ug/L	<MRL	0.20		
	Styrene	ug/L	<MRL	0.20		
	1,1,1,2-Tetrachloroethane	ug/L	<MRL	0.20		
	1,1,2,2-Tetrachloroethane	ug/L	<MRL	0.20		
	Tetrachloroethene	ug/L	<MRL	0.20		
	Toluene	ug/L	<MRL	0.20		
	1,2,3-Trichlorobenzene	ug/L	<MRL	0.20		
	1,2,4-Trichlorobenzene	ug/L	<MRL	0.20		

Reported By: Jorma K. Kuusisto
Chemistry Supervisor

NORTHERN TESTING LABORATORIES, INC.

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Michael Baker, Inc.
4601 Business Park Blvd., Ste. 42
Anchorage, AK 99503

Attn: Jim McGinnis

Client ID: 93-13
Client Project #:
Source:
NTL Lab#: A157249
Sample Matrix: Water
Comments: F179862

Report Date: 8/28/98
Date Arrived: 8/20/98
Sample Date: 8/18/98
Sample Time: 12:00
Collected By:

** Legend **

MRL = Method Report Level
MCL = Max. Contaminant Level
B = Present In Method Blank
E = Estimated Value
M = Matrix Interference
H = Above MCL
D = Lost To Dilution

Method	Parameter	Units	Result	MRL	Date Prepared	Date Analyzed
	1,1,1-Trichloroethane	ug/L	<MRL	0.20		8/24/98
	1,1,2-Trichloroethane	ug/L	<MRL	0.20		
	Trichloroethene	ug/L	<MRL	0.20		
	Trichlorofluoromethane	ug/L	<MRL	0.50		
	1,2,3-Trichloropropane	ug/L	<MRL	0.20		
	1,2,4-Trimethylbenzene	ug/L	<MRL	0.20		
	1,3,5-Trimethylbenzene	ug/L	<MRL	0.20		
	Vinyl Chloride	ug/L	<MRL	0.50		
	m,p-Xylene	ug/L	<MRL	0.20		
	o-Xylene	ug/L	<MRL	0.20		
	Total Trihalomethanes	ug/L	<MRL	0.50		
	4-Bromofluorobenzene	% Recovery	90			
	1,2-Dichlorobenzene-d4	% Recovery	86			
SM 5540 C						
	Foaming Agents (MBAS)	mg/L	<MRL	0.10	8/21/98	8/21/98

Reported By: Jorma K. Kuusisto
Chemistry Supervisor

NORTHERN TESTING LABORATORIES, INC.

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POUCH 340043 PRUDHOE BAY, ALASKA 99734 (907) 659-2145 • FAX 659-2146

DRINKING WATER ANALYSIS REPORT FOR TOTAL COLIFORM BACTERIA

Michael Baker Jr., Inc.
4601 Business Park Blvd.; Ste. 42

Anchorage AK 99503

Date Received: 8/19/98 Time Received: 09:55
Date Analyzed: 8/19/98 Time Analyzed: 13:50
Date Reported: 8/20/98 Time Reported: 15:00
Next Sample Due:

Phone Number:

Fax Number:

Collected by:

Sample Type Routine

Method of Analysis: MMO-MUG (SM 9223 B)

Comments:

Comments
- S = Satisfactory
- U = Unsatisfactory
- POS = Positive Test Result
- ND = None Detected
- TNTC = Too Numerous To Count (>200 Colonies)
- CG = Confluent Growth
- HSM = Heavy Sediment Masking, Results May Not Be Reliable
- SA = Sample Age >30 Hours But <48 Hours, Results May Not Be Reliable
- Old = Sample Age >48 Hours, Too Old For Analysis
- R = Resample Required
- NT = No Test

* # Colonies/100 ml ** # Colonies/ml

Sample Date	Sample Time	Total* Coliform	E. Coli	Other* Bacteria	HPC** Result	Lab#	Location	Comments
8/18/98	12:00	POS	ND	NT	NT	AK2001	93-13	U,
8/18/98	10:00	POS	POS	NT	NT	AK2016	92-82	U,

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AUG 24 1998
MICHAEL BAKER, JR., INC.

Marian Ruth Environmental Analyst 8/20/98
Northern Testing Laboratories, Inc Fairbanks, AK

cc: AKF
Jim Mc
Vlad Petrov/APEL

NORTHERN TESTING LABORATORIES, INC.

3330 INDUSTRIAL AVENUE — FAIRBANKS, ALASKA 99701 — (907) 456-3116 • FAX 456-3125
8005 SCHOON STREET — ANCHORAGE, ALASKA 99518 — (907) 349-1000 • FAX 349-1016
POUCH 340043 — PRUDHOE BAY, ALASKA 99734 — (907) 659-2145 • FAX 659-2146

Michael Baker, Jr. Inc.
4601 Business Park Blvd.; Ste 42
Anchorage AK 99503

Attn: Jim McGinnis, PE

Report Date: 10/08/98

Date Arrived: 09/17/98
Date Sampled: 09/16/98
Time Sampled: 1000
Collected By: -

MRL = Method Reporting Limit

Our Lab #: F180482
Location/Project: Alpine Camp Water System
Your Sample ID: 9313
Sample Matrix: Water
Comments:

* Flag Definitions
B = Below Regulatory Min.
H = Above Regulatory Max.

Lab#	Method	Parameter	Units	Results *	MRL	Digest Prepared	Date Analyzed
F180482	EPA 200.7	Aluminum	mg/L	<MRL	0.02		10/06/98
		Barium	mg/L	0.0703	0.0006		10/06/98
		Beryllium	mg/L	<MRL	0.0006		10/06/98
		Calcium	mg/L	9.35	0.01		10/06/98
		Chromium	mg/L	<MRL	0.003		10/06/98
		Copper	mg/L	<MRL	0.003		10/06/98
		Iron	mg/L	0.086	0.005		10/06/98
		Hardness as CaCO3	mg/L	41.5	0.2		10/06/98
		Magnesium	mg/L	4.40	0.05		10/06/98
		Manganese	mg/L	0.010	0.003		10/06/98
		Sodium	mg/L	14.5	0.03		10/06/98
		Nickel	mg/L	<MRL	0.005		10/06/98
		Zinc	mg/L	0.045	0.003		10/06/98
	EPA 200.9	Silver	mg/L	0.0001	0.0001		09/22/98
		Arsenic	mg/L	<MRL	0.004		09/18/98
		Cadmium	mg/L	<MRL	0.0001		09/25/98
		Antimony	mg/L	<MRL	0.003		09/28/98
		Selenium	mg/L	<MRL	0.004		09/23/98
		Thallium	mg/L	<MRL	0.001		09/28/98
	EPA 245.1	Mercury	mg/L	<MRL	0.0002		09/24/98
	EPA 300.0	Chloride	mg/L	32.1	1.60		09/21/98
		Fluoride	mg/L	0.70	0.06		09/17/98
		Nitrate-N	mg/L	<MRL	0.03		09/17/98
		Sulfate	mg/L	3.0	0.2		09/21/98

Cindy L Christian

Reported By: Cindy L. Christian
Laboratory Director

NORTHERN TESTING LABORATORIES, INC.

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POUCH 340043 PRUDHOE BAY, ALASKA 99734 (907) 659-2145 • FAX 659-2146

Lab#	Method	Parameter	Units	Results *	MRL	Digest Prepared	Date Analyzed
F180482	SM2120-B	Color, Apparent	Unit	10	5		09/17/98
	SM2130-B	Turbidity	NTU	0.85	0.05		09/17/98
	SM2150-B	Odor	TON	2	1		09/17/98
	SM2320-B	Alkalinity as CaCO3	mg/L	30	15		09/23/98
		Bicarbonate Alkalinity (as CaCO3)	mg/L	30	15		09/23/98
	SM2330-B	Langelier Index	Unit	-1.8			10/07/98
	SM2540-C	Total Dissolved Solids	mg/L	112	35		09/22/98
	SM4500-CN -E	Total Cyanide	mg/L	<MRL	0.02		09/23/98
	SM4500-H-B	pH	Unit	7.3			09/17/98

Reported By: Cindy L. Christian
Laboratory Director

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Michael Baker, Inc.
4601 Business Park Blvd., Ste. 42
Anchorage, AK 99503

Attn: Jim McGinnis

Client ID: 9313
Client Project #:
Source:
NTL Lab#: A158253
Sample Matrix: Water
Comments:

Report Date: 9/28/98
Date Arrived: 9/18/98
Sample Date: 9/17/98
Sample Time: 10:00
Collected By:

** Legend **
MRL = Method Report Level
MCL = Max. Contaminant Level
B = Present In Method Blank
E = Estimated Value
M = Matrix Interference
H = Above MCL
D = Lost To Dilution

Method	Parameter	Units	Result	MRL	Date Prepared	Date Analyzed
EPA 524.2						
	Benzene	ug/L	<MRL	0.20		9/22/98
	Bromobenzene	ug/L	<MRL	0.20		
	Bromochloromethane	ug/L	<MRL	0.20		
	Bromodichloromethane	ug/L	<MRL	0.20		
	Bromoform	ug/L	<MRL	0.50		
	Bromomethane	ug/L	<MRL	1.00		
	n-Butylbenzene	ug/L	<MRL	0.20		
	sec-Butylbenzene	ug/L	<MRL	0.20		
	tert-Butylbenzene	ug/L	<MRL	0.20		
	Carbon Tetrachloride	ug/L	<MRL	0.20		
	Chlorobenzene	ug/L	<MRL	0.20		
	Chloroethane	ug/L	<MRL	1.00		
	Chloroform	ug/L	<MRL	0.30		
	Chloromethane	ug/L	<MRL	0.50		
	2-Chlorotoluene	ug/L	<MRL	0.20		
	4-Chlorotoluene	ug/L	<MRL	0.20		
	Dibromochloromethane	ug/L	<MRL	0.20		
	Dibromomethane	ug/L	<MRL	0.20		
	1,2-Dichlorobenzene	ug/L	<MRL	0.20		
	1,3-Dichlorobenzene	ug/L	<MRL	0.20		
	1,4-Dichlorobenzene	ug/L	<MRL	0.20		
	Dichlorodifluoromethane	ug/L	<MRL	0.50		
	1,1-Dichloroethane	ug/L	<MRL	0.20		

Reported By: Jorma K. Kuusisto
Chemistry Supervisor

NORTHERN TESTING LABORATORIES, INC.

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Michael Baker, Inc.
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Anchorage, AK 99503

Attn: Jim McGinnis

Client ID: 9313
Client Project #:
Source:
NTL Lab#: A158253
Sample Matrix: Water
Comments:

Report Date: 9/28/98
Date Arrived: 9/18/98
Sample Date: 9/17/98
Sample Time: 10:00
Collected By:

** Legend **
MRL = Method Report Level
MCL = Max. Contaminant Level
B = Present In Method Blank
E = Estimated Value
M = Matrix Interference
H = Above MCL
D = Lost To Dilution

Method	Parameter	Units	Result	MRL	Date Prepared	Date Analyzed
	1,2-Dichloroethane	ug/L	<MRL	0.20		9/22/98
	1,1-Dichloroethene	ug/L	<MRL	0.20		
	cis-1,2-Dichloroethene	ug/L	<MRL	0.20		
	trans-1,2-Dichloroethene	ug/L	<MRL	0.20		
	1,2-Dichloropropane	ug/L	<MRL	0.20		
	1,3-Dichloropropane	ug/L	<MRL	0.20		
	2,2-Dichloropropane	ug/L	<MRL	0.20		
	1,1-Dichloropropene	ug/L	<MRL	0.20		
	cis-1,3-Dichloropropene	ug/L	<MRL	0.20		
	trans-1,3-Dichloropropene	ug/L	<MRL	0.20		
	Ethylbenzene	ug/L	<MRL	0.20		
	Hexachlorobutadiene	ug/L	<MRL	0.20		
	Isopropylbenzene	ug/L	<MRL	0.20		
	p-Isopropyltoluene	ug/L	<MRL	0.20		
	Methylene Chloride	ug/L	<MRL	0.50		
	Naphthalene	ug/L	<MRL	0.20		
	n-Propylbenzene	ug/L	<MRL	0.20		
	Styrene	ug/L	<MRL	0.20		
	1,1,1,2-Tetrachloroethane	ug/L	<MRL	0.20		
	1,1,2,2-Tetrachloroethane	ug/L	<MRL	0.20		
	Tetrachloroethene	ug/L	<MRL	0.20		
	Toluene	ug/L	0.42	0.20		
	1,2,3-Trichlorobenzene	ug/L	<MRL	0.20		
	1,2,4-Trichlorobenzene	ug/L	<MRL	0.20		

Reported By: Jorma K. Kuusisto
Chemistry Supervisor

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Michael Baker, Inc.
4601 Business Park Blvd., Ste. 42
Anchorage, AK 99503

Attn: Jim McGinnis

Client ID: 9313
Client Project #:
Source:
NTL Lab#: A158253
Sample Matrix: Water
Comments:

Report Date: 9/28/98
Date Arrived: 9/18/98
Sample Date: 9/17/98
Sample Time: 10:00
Collected By:

** Legend **
MRL = Method Report Level
MCL = Max. Contaminant Level
B = Present In Method Blank
E = Estimated Value
M = Matrix Interference
H = Above MCL
D = Lost To Dilution

Method	Parameter	Units	Result	MRL	Date Prepared	Date Analyzed
	1,1,1-Trichloroethane	ug/L	<MRL	0.20		9/22/98
	1,1,2-Trichloroethane	ug/L	<MRL	0.20		
	Trichloroethene	ug/L	<MRL	0.20		
	Trichlorofluoromethane	ug/L	<MRL	0.50		
	1,2,3-Trichloropropane	ug/L	<MRL	0.20		
	1,2,4-Trimethylbenzene	ug/L	<MRL	0.20		
	1,3,5-Trimethylbenzene	ug/L	<MRL	0.20		
	Vinyl Chloride	ug/L	<MRL	0.50		
	m,p-Xylene	ug/L	<MRL	0.20		
	o-Xylene	ug/L	<MRL	0.20		
	Total Trihalomethanes	ug/L	<MRL	0.50		
	4-Bromofluorobenzene	% Recovery	91			
	1,2-Dichlorobenzene-d4	% Recovery	85			
SM 5540 C						
	Foaming Agents (MBAS)	mg/L	<MRL	0.10		9/18/98

Reported By: Jorma K. Kuusisto
Chemistry Supervisor

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DRINKING WATER ANALYSIS REPORT FOR TOTAL COLIFORM BACTERIA

Michael Baker Jr., Inc.
4601 Business Park Blvd.; Ste. 42

Anchorage AK 99503

Date Received: 9/17/98 Time Received: 11:30
Date Analyzed: 9/17/98 Time Analyzed: 13:50
Date Reported: 9/18/98 Time Reported: 15:00
Next Sample Due:

Phone Number:

Fax Number:

Collected by:

Sample Type

Method of Analysis: MMO-MUG (SM 9223 B)

Comments:

Comments

- S = Satisfactory
- U = Unsatisfactory
- POS = Positive Test Result
- ND = None Detected
- TNTC = Too Numerous To Count (>200 Colonies)
- CG = Confluent Growth
- HSM = Heavy Sediment Masking, Results May Not Be Reliable
- SA = Sample Age >30 Hours But <48 Hours, Results May Not Be Reliable
- Old = Sample Age >48 Hours, Too Old For Analysis
- R = Resample Required
- NT = No Test

* # Colonies/100 ml ** # Colonies/ml

Sample Date	Sample Time	Total* Coliform	E. Coli	Other* Bacteria	HPC** Result	Lab#	Location	Comments
9/16/98	10:00	ND	ND	NT	NT	AK3094	9313	Satisfactory
9/16/98	10:00	ND	ND	NT	NT	AK3102	9282	Satisfactory

Marian Ruth Environmental Analyst 9/18/98

Northern Testing Laboratories, Inc Fairbanks, AK

NORTHERN TESTING LABORATORIES, INC.

3330 INDUSTRIAL AVENUE, FAIRBANKS, ALASKA 99701, (907) 456-3116 • FAX 456-3125
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POUCH 340043, PRUDHOE BAY, ALASKA 99734, (907) 659-2145 • FAX 659-2146

Michael Baker, Jr. Inc.
4601 Business Park Blvd.; Ste 42
Anchorage AK 99503

Attn: Jim McGinnis, PE

Report Date: 10/20/98

Date Arrived: 10/02/98
Date Sampled: 09/30/98
Time Sampled: -
Collected By: -

MRL = Method Reporting Limit

* Flag Definitions
B = Below Regulatory Min.
H = Above Regulatory Max.

Our Lab #: F180795
Location/Project: -
Your Sample ID: 93-13
Sample Matrix: Water
Comments:

Lab#	Method	Parameter	Units	Results *	MRL	Digest Prepared	Date Analyzed
F180795	EPA 200.7	Aluminum	mg/L	<MRL	0.02		10/06/98
		Barium	mg/L	0.0670	0.0006		10/06/98
		Beryllium	mg/L	<MRL	0.0006		10/06/98
		Calcium	mg/L	9.47	0.01		10/06/98
		Chromium	mg/L	<MRL	0.003		10/06/98
		Copper	mg/L	<MRL	0.003		10/06/98
		Iron	mg/L	0.079	0.005		10/06/98
		Hardness as CaCO3	mg/L	41.9	0.2		10/06/98
		Magnesium	mg/L	4.43	0.05		10/06/98
		Manganese	mg/L	0.009	0.003		10/06/98
		Sodium	mg/L	14	0.03		10/06/98
		Nickel	mg/L	<MRL	0.005		10/06/98
		Zinc	mg/L	<MRL	0.003		10/06/98
	EPA 200.9	Silver	mg/L	<MRL	0.0001		10/02/98
		Arsenic	mg/L	<MRL	0.004		10/08/98
		Cadmium	mg/L	<MRL	0.0001		10/06/98
		Antimony	mg/L	<MRL	0.003		10/05/98
		Selenium	mg/L	<MRL	0.004		10/12/98
		Thallium	mg/L	<MRL	0.001		10/09/98
	EPA 245.1	Mercury	mg/L	<MRL	0.0002		10/19/98
	EPA 300.0	Chloride	mg/L	28.9	1.60		10/12/98
		Fluoride	mg/L	<MRL	0.06		10/12/98
		Nitrate-N	mg/L	<MRL	0.03		10/02/98
		Sulfate	mg/L	2.8	0.2		10/02/98

Cindy L. Christian

Reported By: Cindy L. Christian
Laboratory Director

NORTHERN TESTING LABORATORIES, INC.

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POUCH 340043, PRUDHOE BAY, ALASKA 99734, (907) 659-2145 • FAX 659-2146

Lab#	Method	Parameter	Units	Results *	MRL	Digest Prepared	Date Analyzed
F180795	SM2130-B	Turbidity	NTU	0.55	0.05		10/02/98
	SM2320-B	Alkalinity as CaCO3	mg/L	32	15		10/06/98
		Bicarbonate Alkalinity (as CaCO3)	mg/L	32	15		10/06/98
	SM2330-B	Langelier Index	Unit	-1.5			10/13/98
	SM2540-C	Total Dissolved Solids	mg/L	92	35		10/06/98
	SM4500-CN -E	Total Cyanide	mg/L	<MRL	0.02		10/05/98
	SM4500-H-B	pH	Unit	7.5			10/02/98

Cindy L Christian

Reported By: Cindy L. Christian
Laboratory Director

NORTHERN TESTING LABORATORIES, INC.

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POUCH 340043 — PRUDHOE BAY, ALASKA 99734 — (907) 659-2145 • FAX 659-2146

Michael Baker, Inc.
4601 Business Park Blvd., Ste. 42
Anchorage, AK 99503

Attn: Jim McGinnis

Client ID: 93-13
Client Project #:
Source:
NTL Lab#: A158452
Sample Matrix: Water
Comments:

Report Date: 10/14/98
Date Arrived: 10/1/98
Sample Date: 9/30/98
Sample Time:
Collected By:

** Legend **

MRL = Method Report Level
MCL = Max. Contaminant Level
B = Present In Method Blank
E = Estimated Value
M = Matrix Interference
H = Above MCL
D = Lost To Dilution

Method	Parameter	Units	Result	MRL	Date Prepared	Date Analyzed
EPA 150.1						
	pH	Unit	7.36			10/1/98
EPA 524.2						
	Benzene	ug/L	<MRL	0.20		10/2/98
	Bromobenzene	ug/L	<MRL	0.20		
	Bromochloromethane	ug/L	<MRL	0.20		
	Bromodichloromethane	ug/L	<MRL	0.20		
	Bromoform	ug/L	<MRL	0.50		
	Bromomethane	ug/L	<MRL	1.00		
	n-Butylbenzene	ug/L	<MRL	0.20		
	sec-Butylbenzene	ug/L	<MRL	0.20		
	tert-Butylbenzene	ug/L	<MRL	0.20		
	Carbon Tetrachloride	ug/L	<MRL	0.20		
	Chlorobenzene	ug/L	<MRL	0.20		
	Chloroethane	ug/L	<MRL	1.00		
	Chloroform	ug/L	<MRL	0.30		
	Chloromethane	ug/L	<MRL	0.50		
	2-Chlorotoluene	ug/L	<MRL	0.20		
	4-Chlorotoluene	ug/L	<MRL	0.20		
	Dibromochloromethane	ug/L	<MRL	0.20		
	Dibromomethane	ug/L	<MRL	0.20		
	1,2-Dichlorobenzene	ug/L	<MRL	0.20		
	1,3-Dichlorobenzene	ug/L	<MRL	0.20		
	1,4-Dichlorobenzene	ug/L	<MRL	0.20		

Jorma Kuusisto

Reported By: Jorma K. Kuusisto
Chemistry Supervisor

NORTHERN TESTING LABORATORIES, INC.

3330 INDUSTRIAL AVENUE
8005 SCHOON STREET
POUCH 340043

FAIRBANKS, ALASKA 99701
ANCHORAGE, ALASKA 99518
PRUDHOE BAY, ALASKA 99734

(907) 456-3116 • FAX 456-3125
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(907) 659-2145 • FAX 659-2146

Michael Baker, Inc.
4601 Business Park Blvd., Ste. 42
Anchorage, AK 99503

Attn: Jim McGinnis

Client ID: 93-13
Client Project #:
Source:
NTL Lab#: A158452
Sample Matrix: Water
Comments:

Report Date: 10/14/98
Date Arrived: 10/1/98
Sample Date: 9/30/98
Sample Time:
Collected By:

** Legend **

MRL = Method Report Level
MCL = Max. Contaminant Level
B = Present In Method Blank
E = Estimated Value
M = Matrix Interference
H = Above MCL
D = Lost To Dilution

Method	Parameter	Units	Result	MRL	Date Prepared	Date Analyzed
	Dichlorodifluoromethane	ug/L	<MRL	0.50		10/2/98
	1,1-Dichloroethane	ug/L	<MRL	0.20		
	1,2-Dichloroethane	ug/L	<MRL	0.20		
	1,1-Dichloroethene	ug/L	<MRL	0.20		
	cis-1,2-Dichloroethene	ug/L	<MRL	0.20		
	trans-1,2-Dichloroethene	ug/L	<MRL	0.20		
	1,2-Dichloropropane	ug/L	<MRL	0.20		
	1,3-Dichloropropane	ug/L	<MRL	0.20		
	2,2-Dichloropropane	ug/L	<MRL	0.20		
	1,1-Dichloropropene	ug/L	<MRL	0.20		
	cis-1,3-Dichloropropene	ug/L	<MRL	0.20		
	trans-1,3-Dichloropropene	ug/L	<MRL	0.20		
	Ethylbenzene	ug/L	<MRL	0.20		
	Hexachlorobutadiene	ug/L	<MRL	0.20		
	Isopropylbenzene	ug/L	<MRL	0.20		
	p-Isopropyltoluene	ug/L	<MRL	0.20		
	Methylene Chloride	ug/L	<MRL	0.50		
	Naphthalene	ug/L	<MRL	0.20		
	n-Propylbenzene	ug/L	<MRL	0.20		
	Styrene	ug/L	<MRL	0.20		
	1,1,1,2-Tetrachloroethane	ug/L	<MRL	0.20		
	1,1,2,2-Tetrachloroethane	ug/L	<MRL	0.20		
	Tetrachloroethene	ug/L	<MRL	0.20		
	Toluene	ug/L	<MRL	0.20		

Reported By: Jorma K. Kuusisto
Chemistry Supervisor

NORTHERN TESTING LABORATORIES, INC.

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Michael Baker, Inc.
4601 Business Park Blvd., Ste. 42
Anchorage, AK 99503

Attn: Jim McGinnis

Client ID: 93-13
Client Project #:
Source:
NTL Lab#: A158452
Sample Matrix: Water
Comments:

Report Date: 10/14/98
Date Arrived: 10/1/98
Sample Date: 9/30/98
Sample Time:
Collected By:

** Legend **

MRL = Method Report Level
MCL = Max. Contaminant Level
B = Present In Method Blank
E = Estimated Value
M = Matrix Interference
H = Above MCL
D = Lost To Dilution

Method	Parameter	Units	Result	MRL	Date Prepared	Date Analyzed
	1,2,3-Trichlorobenzene	ug/L	<MRL	0.20		10/2/98
	1,2,4-Trichlorobenzene	ug/L	<MRL	0.20		
	1,1,1-Trichloroethane	ug/L	<MRL	0.20		
	1,1,2-Trichloroethane	ug/L	<MRL	0.20		
	Trichloroethene	ug/L	<MRL	0.20		
	Trichlorofluoromethane	ug/L	<MRL	0.50		
	1,2,3-Trichloropropane	ug/L	<MRL	0.20		
	1,2,4-Trimethylbenzene	ug/L	<MRL	0.20		
	1,3,5-Trimethylbenzene	ug/L	<MRL	0.20		
	Vinyl Chloride	ug/L	<MRL	0.50		
	m,p-Xylene	ug/L	<MRL	0.20		
	o-Xylene	ug/L	<MRL	0.20		
	Total Trihalomethanes	ug/L	<MRL	0.50		
	4-Bromofluorobenzene	% Recovery	89			
	1,2-Dichlorobenzene-d4	% Recovery	85			
SM 2120 B						
	Color, Apparent	Unit	<MRL	5.00		10/2/98
SM 2150 B						
	Odor	TON	<MRL	1.00		10/2/98
SM 5540 C						
	Foaming Agents (MBAS)	mg/L	<MRL	0.10		10/2/98

Reported By: Jorma K. Kuusisto
Chemistry Supervisor

NORTHERN TESTING LABORATORIES, INC.

3330 INDUSTRIAL AVENUE · FAIRBANKS, ALASKA 99701 · (907) 456-3116 • FAX 456-3125
8005 SCHOON STREET · ANCHORAGE, ALASKA 99518 · (907) 349-1000 • FAX 349-1016
POUCH 340043 · PRUDHOE BAY, ALASKA 99734 · (907) 659-2145 • FAX 659-2146

DRINKING WATER ANALYSIS REPORT FOR TOTAL COLIFORM BACTERIA

Attn: Jim McGinnis
Michael Baker, Incorporated
4601 Business Park Blvd., Ste. #42

Anchorage, AK 99503

Date Received:	10/1/98	Time Received:	13:00
Date Analyzed:	10/1/98	Time Analyzed:	17:30
Date Reported:	10/9/98	Time Reported:	09:50
Next Sample Due:			

Phone Number:

Fax Number:

Collected by:

Sample Type: Special Purpose

Method of Analysis: MMO-MUG (SM 9223 B)

Comments:

Comments
- S = Satisfactory
- U = Unsatisfactory
- POS = Positive Test Result
- ND = None Detected
- TNTC = Too Numerous To Count (>200 Colonies)
- CG = Confluent Growth
- HSM = Heavy Sediment Masking, Results May Not Be Reliable
- SA = Sample Age >30 Hours But <48 Hours, Results May Not Be Reliable
- Old = Sample Age >48 Hours, Too Old For Analysis
- R = Resample Required
- NT = No Test

* # Colonies/100 ml ** # Colonies/ml

Sample Date	Sample Time	Total* Coliform	Fecal Coliform	Other* Bacteria	HPC** Result	Lab#	Location	Comments
		POS	ND	NT	NT	AK3092	93-13	U,
9/30/98		POS	ND	NT	NT	AK3093		U,

Sheri L Trask

Sheri L Trask Environmental Analyst 10/9/98

Northern Testing Laboratories, Inc. Anchorage, AK

NORTHERN TESTING LABORATORIES, INC.

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Michael Baker, Jr. Inc.
4601 Business Park Blvd.; Ste 42
Anchorage AK 99503

Attn: Jim McGinnis, PE

Report Date: 07/22/98

Date Arrived: 05/28/98
Date Sampled: 05/26/98
Time Sampled: 1210
Collected By: -

MRL = Method Reporting Limit

* Flag Definitions
B = Below Regulatory Min.
H = Above Regulatory Max.

Our Lab #: F178231
Location/Project: Alpine Camp Water System
Your Sample ID: L93-13
Sample Matrix: Water
Comments:

Lab#	Method	Parameter	Units	Results *	MRL	Digest Prepared	Date Analyzed
F178231	EPA 900.0	Gross Alpha	pCi/L	ND@1+/-0.38			07/08/98

Cindy L. Christian

Reported By: Cindy L. Christian
Laboratory Director

NORTHERN TESTING LABORATORIES, INC.

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Michael Baker, Jr. Inc.
4601 Business Park Blvd.; Ste 42
Anchorage AK 99503

Attn: Jim McGinnis, PE

Report Date: 07/22/98

Date Arrived: 06/11/98
Date Sampled: 06/09/98
Time Sampled: 0900
Collected By: DAD/KHE

MRL = Method Reporting Limit

Our Lab #: F178543
Location/Project: Alpine Camp Water System
Your Sample ID: 93-13
Sample Matrix: Water
Comments:

* Flag Definitions
B = Below Regulatory Min.
H = Above Regulatory Max.

Lab#	Method	Parameter	Units	Results *	MRL	Digest Prepared	Date Analyzed
F178543	EPA 900.0	Gross Alpha	pCi/L	ND@1+/-0.42			07/08/98

Reported By: Cindy L. Christian
Laboratory Director