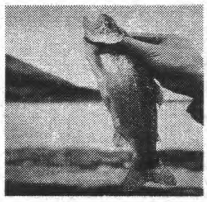
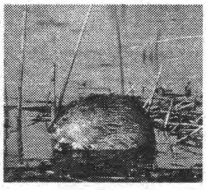
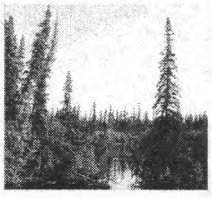
Canada Alberta Northwest Territories

Northern River Basins Study





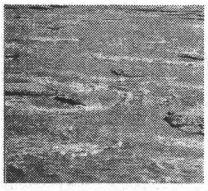



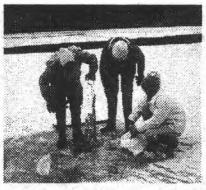




NORTHERN RIVER BASINS STUDY PROJECT REPORT NO. 55

A REVIEW AND ANALYSIS OF EXISTING ALBERTA DATA ON DRINKING WATER QUALITY AND TREATMENT FACILITIES

FOR THE NORTHERN RIVER BASINS STUDY



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under Project 4401-C1

by

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PREFACE:

The Northern River Basins Study was initiated through the "Canada-Alberta-Northwest Territories Agreement Respecting the Peace-Athabasca-Slave River Basin Study, Phase II - Technical Studies" which was signed September 27, 1991. The purpose of the Study is to understand and characterize the cumulative effects of development on the water and aquatic environment of the Study Area by coordinating with existing programs and undertaking appropriate new technical studies.

This publication reports the method and findings of particular work conducted as part of the Northern River Basins Study. As such, the work was governed by a specific terms of reference and is expected to contribute information about the Study Area within the context of the overall study as described by the Study Final Report. This report has been reviewed by the Study Science Advisory Committee in regards to scientific content and has been approved by the Study Board of Directors for public release.

It is explicit in the objectives of the Study to report the results of technical work regularly to the public. This objective is served by distributing project reports to an extensive network of libraries, agencies, organizations and interested individuals and by granting universal permission to reproduce the material.

This report contains referenced data obtained from sources external to the Northern River Basins Study. Individuals interested in using external data must obtain permission to do so from the donor agency.

NORTHERN RIVER BASINS STUDY
PROJECT REPORT RELEASE FORM

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Whereas the above publication is the result of a project conducted under the Northern River Basins Study and the terms of reference for that project are deemed to be fulfilled,
IT IS THEREFORE REQUESTED BY THE STUDY OFFICE THAT;
this publication be subjected to proper and responsible review and be considered for release to the public.

F. J. Wrona — 7 June 95
(Dr. F. J. Wrona, Ph.D., Science Director) (Date)

Whereas it is an explicit term of reference of the Science Advisory Committee "to review, for scientific content, material for publication by the Board",
IT IS HERE ADVISED BY THE SCIENCE ADVISORY COMMITTEE THAT;
this publication has been reviewed for scientific content and that the scientific practices represented in the report are acceptable given the specific purposes of the project and subject to the field conditions encountered.
SUPPLEMENTAL COMMENTARY HAS BEEN ADDED TO THIS PUBLICATION: [ ] Yes [ ] No

P. A. Larkin — 7 June 95
(Dr. P. A. Larkin, Ph.D., Chair) (Date)

Whereas the Study Board is satisfied that this publication has been reviewed for scientific content and for immediate health implications,
IT IS HERE APPROVED BY THE BOARD OF DIRECTORS THAT;
this publication be released to the public, and that this publication be designated for: **[ ] STANDARD AVAILABILITY [ ] EXPANDED AVAILABILITY**

Lucille Partington — June 8/95
(Lucille Partington, Co-chair) (Date)

Robert McLeod — June 12/95
(Robert McLeod, Co-chair) (Date)

A REVIEW AND ANALYSIS OF EXISTING ALBERTA DATA ON DRINKING WATER QUALITY AND TREATMENT FACILITIES FOR THE NORTHERN RIVER BASINS STUDY

STUDY PERSPECTIVE

Prior to and during the Northern River Basins Study, residents have raised concerns about their drinking water. The purpose of this project was to review the existing drinking water data bases and document the drinking water treatment facilities present in the study area and the processes used. In addition to providing the study with an inventory of facilities and processes, it also provides a comparison of treatment performance to the Canada Drinking Water Quality Guidelines.

Related Study Questions

2) *What is the current state of water quality in the Peace, Athabasca and Slave river basins, including the Peace-Athabasca Delta?*

8) *Recognizing that people drink water and eat fish from these river systems, what is the current concentration of contaminants in water and edible fish tissue and how are these levels changing through time and by location?*

The review was unable to substantiate any association between drinking water quality and type of treatment process, or between the population of localities and water use trends. The project also revealed that drinking water quality was more closely related with the operational management of the treatment facility than the actual treatment process used. Examination of water use trends revealed them to be very site specific and largely depended on economic conditions within that community.

Drinking water quality records for communities in the Northwest Territories will be reviewed in a subsequent report.

This project is a first step to further studies into drinking water quality. Other projects will build on this project and examine odour problems in drinking water, water treatment practices and their effectiveness, and the incidence of waterborne diseases noted from a review of existing health records. Collectively, these projects will give the study a picture of the drinking water quality in the Peace, Athabasca and Slave river basins and assist in the preparation of recommendations for management of drinking water and future studies.

REPORT SUMMARY

The primary purpose of this report is to gather existing data that will give direction to later studies of drinking water quality in the NRBS area. The information gathered is in the areas of existing water quality, facility inventories and standards and regulations. Analysis of existing data has indicated that generally drinking water quality meets all applicable guidelines and regulations. However a number of samples did exceed standards set out in "Guidelines for Canadian Drinking Water Quality" (GCDWQ). The parameter most often exceeded which may be of some health concern was turbidity. Turbidity on its own does not necessarily result in health concerns however it has been shown to be related to the effectiveness of the treatment facility in the removal of microbial contaminants and can also limit disinfection effectiveness. Of the roughly 420 samples analyzed 64 samples had values of turbidity greater than 1 NTU. The standards state that turbidity could exceed 1 NTU if it is demonstrated that disinfection is not compromised. It is not clear if these sites with turbidity greater than 1 NTU have confirmed that disinfection is not compromised. Two other parameters of concern which were exceeded in a few instances were chloroform and 1,2 dichlorobenzene. By far most of the samples which exceeded the GCDWQ were for parameters which have aesthetic objectives and most of these were due to the high dissolved solids associated with ground water sources.

The facilities that had a ground water source produced water that was generally higher in TDS, lower in chloroform and less corrosive than facilities using surface water. The comparison of treatment processes used to water quality produced did not provide many correlation's because of uncertainty in the processes being used at facilities and the sensitivity of facility performance to operational factors.

Further study of drinking water quality in the NRBS area should include:

- Sampling of drinking water for physical, chemical and microbial quality to verify existing data and maintain the independence of the study,
- Verification of the information collected on the inventory of facilities,
- Investigation of taste and odour problems, and
- A clarification of the standard being use for turbidity.

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1.0 INTRODUCTION

The quality of drinking water is primarily depended on three factors which are the raw water quality, the treatment process used, and the distribution system. The first step in assessing drinking water quality in the Northern River Basin Study (NRBS) area is to obtain as much existing information as possible. This information then needs to be compiled, synthesized, and summarized in a useful format in order to provide direction and background to other drinking water studies in the NRBS.

The information gathered is in three areas; drinking water quality information; drinking water facility inventory; and treatment effectiveness by comparison of raw and treated water quality. The primary source of information has been the government agencies that have jurisdiction over drinking water quality.

This report summaries the results of the gathering of existing information.

2.0 INFORMATION SOURCES

2.1 Drinking Water Standards

The public has demanded that special care be taken concerning drinking water and as such considerable effort has been expended and continues to be expended to determine water quality characteristics that are suitable for human consumption. This information is then used by governing bodies to establish drinking water standards. The jurisdiction over drinking water lies with the provinces and in Alberta the standards are outlined in "Standards and Guidelines for Municipal Water Supply, Wastewater, and Storm Drainage Facilities" (Alberta Environmental Protection (AEP) 1988). A discussion of the position taken by AEP on drinking water quality is in section 4.4 and 4.4.1 of the document and it is as follows:

"4.4 Minimum Requirements

> The availability and quality of drinking water can have a significant impact on both the public health and the overall quality of life within a community. A major objective of Alberta Environment is to ensure that drinking water supplies and treatment systems provide a high level of public health protection while being able to meet the water supply needs of the community.
>
> In developing a drinking water supply system the following three requirements must be satisfied:

1) The water delivered to consumers shall meet the health related quality standards as outlined in the Health and Welfare Canada Guidelines for Canadian Drinking Water Quality. For those standards based on aesthetic considerations, less stringent requirements may be adopted by Alberta Environment.;

2) The water treatment system shall provide a basic level of protection against all possible sources and types of raw and treated water contamination; and,

3) Sufficient water must be available to meet the needs of the consumers, which may include fire protection."

"4.4.1 Drinking Water Quality

Pursuant to Section 23 of the Alberta Clean Water (Municipal Plants) Regulations, the drinking water quality criteria developed by the Federal-Provincial Working Group on Drinking Water Quality and published by Health and Welfare Canada have been adopted as the general quality standards for all provincial drinking waters. On a provincial or local basis, parameters can be changed by the Director of Standards and Approvals to reflect either new scientific information or site specific problems.

Drinking water quality standards are based on the best available and most current aesthetic and health effect information.. The methods of generating or obtaining health effect information vary depending on the nature of the substance or compound being evaluated, and establishing numerical limits for potentially toxic or carcinogenic substances in drinking water is often extremely difficult. In general, conservative models and large factors of safety are used to develop drinking water quality standards; this approach ensures a high level of public health protection.

Standards, however, cannot be considered as representing a clean demarcation between safe and unsafe drinking water. Every effort should therefore be made to protect water supplies from contamination and to produce the best possible quality drinking water. While occasionally exceeding the drinking water quality standards may not be cause for public health concern, the reasons for exceeding the standards should be immediately determined and the appropriate remedial actions initiated."

A summary of the parameters given in "Guidelines for Canadian Drinking Water Quality"(GCDWQ) are in Appendix **C**. The guideline uses three levels of standards which are denoted by the terms maximum acceptable concentration (MAC), interim maximum acceptable concentration (IMAC), and aesthetic objective (AO). Substances which have a MAC listed indicates that there is a known or suspected health risk associated with a

lifelong consumption of drinking water equal to or greater than the given concentration of the substance. The IMAC are for substances where there is insufficient toxicological data to establish a MAC. The AO are for substances or characteristic of water that affect its acceptance by consumers. A detailed explanation of the terms use by GCDWQ are available in the document (Federal-Provincial Subcommittee on Drinking Water of the Federal-Provincial Advisory Committee on Environmental and Occupational Health. 1993).

The following excerpt from GCDWQ explains how the MAC standards should be interpreted:

> "Drinking water that continually contains a substance at a level greater than its maximum acceptable concentration will contribute significantly to consumers' exposure to the substance and may, in some instances, induce deleterious effects on health. However, short-term excursions above the maximum acceptable concentration do not necessarily mean that the water constitutes an undue risk to health. The amount by which, and the period for which, the maximum acceptable concentration can be exceeded without posing a health risk must be assessed by taking into account the toxicity of the substance involved. When the maximum acceptable concentration for a substance is exceeded, however, the minimum action required is immediate resampling. If the maximum acceptable concentration continues to be exceeded, the local authority responsible for drinking water supplies should be consulted concerning appropriate corrective action."

2.2 Drinking Water Quality Information

The main source of information on drinking water quality was Alberta Environmental Protection's treated water survey. This is a program of sampling drinking water facilities in an effort to assess the quality of drinking water. Several databases containing the results of the treated water survey were down loaded from the AEP mainframe to PC database format. There was a total of 1600 samples taken province wide and 460 taken in the northern river basins. The majority of the samples were analyzed for 46 heavy metal and routine parameters, 58 volatile compounds, 65 semivolatile compounds, and 77 herbicides and pesticides. The samples were taken by AEP staff and analysis was done at the Alberta Environment Center in Vegreville .

2.3 Facility Information

Information on the water treatment facility in the northern river basins was also obtained from Alberta Environmental Protection. The majority of the information was part of a summary of water and wastewater facilities and included the population served, facility

status, raw water source, treatment processes used, raw and treated water storage volumes. Other information was obtained that provided the locations of the facilities.

3.0 SUMMARY OF INFORMATION

The summary of the existing information is presented in the appendices at the back of the report. The following sections provide a listing of the contents of the appendices and a brief explanation of the methods used in manipulating the data.

3.1 Discussion of Appendix B

The data was down loaded from AEP mainframe computers to a personal computer database format. The software packages used to transform the data, generate summary statistics, and link the data to other information were Clipper® and dBase IV®; while spreadsheet work like table and chart generation was accomplished with Microsoft Excel ®. Lotus Freelance® was also use in graphical applications.

The data analysis involved the grouping of the treatment sites and the calculation of statistics (means and standard deviations) for the comparison of effluent quality. Data for environmental parameters is log-normally distributed and therefore a log-normal transformation was used and the calculations of the means and standard deviations was performed on the natural logarithm of the data (Prince, 1993).

There were several files of databases containing the data from the treated water survey. Each record was identified as to its location, date sampled, and the laboratory analysis sample number. Each substance had two fields or columns. One, a numeric field containing the analysis result, and the other, a character field that would identify whether the result was below the detection limit or if there were other problems in the analysis. If the symbols "<" or "U" appear in the character field it means that the parameter was not detected and the value given is the MDL (method detection limit). The symbol "B" indicates that the parameter was found in the blank and the result is questionable. The symbol "X" appears if the value is an estimate below the MDL.

Site-average parameters were established by grouping the samples common sites and averaging the values of the various parameters which were above the detection limit. It is recognized that these averages are biased high because their calculation ignores any values below the detection limit. There are techniques available to better estimate the average when censored data is involved, but for these summaries it is sufficient to use the biased high averages and acknowledge the number of values below the detection limit. These site-average parameters are summarized in Appendix B for all the NRBS sites in the treated water survey. The summaries identify the site, the raw water source and type, whether it is ground or surface water, the population served, the compound names, the mean and standard deviation, the number of samples above the detection limit and the

total number of samples taken.

3.1.1 Corrosion Indices

Corrosion is a common problem that affects the distribution lines and equipment of most water utilities and plumbing in homes. Indices have been developed to help predict the corrosive characteristics of the water. The Langelier Saturation Index (LSI) and the Aggressive Index (AI) are used to predict a water's tendency to precipitate or dissolve $CaCO_{3(S)}$. These indices do not predict the amounts of $CaCO_{3(S)}$ that will be precipitated. Another index that provides information on the corrosive tendencies of water is the Larson's Ratio (LR). The LR is based on the corrosive behavior of chloride and sulfate ions and the protective properties of bicarbonate. More information on these indices can be found in any water treatment text book. The values of these indices and their indication of the corrosive tendencies is as follows:

LSI < 0	water is under saturated with respect to $CaCO_3$
LSI > 0	water is over saturated with respect to $CaCO_3$
AI < 10	water is very aggressive
AI = 10 to 12	water is moderately aggressive
AI > 12	water is non-aggressive
LR > 0.2	increased corrosion

Based on the data in the treated water survey the three indices described above were calculated and add to the list of parameters for the sites in the treated water survey.

3.2 Discussion of Appendix C

Appendix C contains the overall summary of the treated water survey and the Guidelines for Canadian Drinking Water Quality (GCDWQ) that apply. For each parameter the summary identifies the GCDWQ value, if any, the method detection limit (MDL), the number of samples taken in the NRBS study area, the number of sites sampled in the NRBS area, the number of those samples that were greater than MDL and the number of sites whose average was greater than MDL. An overall NRBS area average for each parameter was established based on the site-average parameters that were greater than MDL. The upper and lower 95% confidence limit for each parameter is also included. Again, the average and the 95% confidence limits for these parameters are biased high if there are samples and sites below the detection limit. It is noted that the method detection limit varies for some parameters as some analysis techniques have changed over time. At the end of Appendix C there is a list of parameters from GCDWQ that were not included in the parameters analyzed in the treated water survey.

The figures following the overall summary of the treated water survey contain frequency distributions for the parameters regulated by GCDWQ. The figures illustrate the distribution of the parameter versus the GCDWQ. There are some parameters that were not plotted because they did not have enough sites above the MDL. An example of these figures is shown in Figure 1 which is the distribution of the pH for the NRBS sites in the treated water survey.

3.3 Discussion of Appendix D

Appendix D is a listing of all the samples that have exceeded GCDWQ. Included in the listing are the sample location, the type of source, be it surface or ground water, and the parameters that were outside of GCDWQ. The appendix shows that the guideline for turbidity (1 NTU) is often exceeded and it should be recognized that GCDWQ has stated that turbidity can exceed 1 NTU if it does not compromise disinfection. It is not clear if these sites with turbidity greater than 1 NTU have confirmed that disinfection is not compromised.

3.4 Discussion of Appendix E

Appendix E is a summary of the water treatment facilities in the NRBS. The information included in this summary is the facility name, the status, be it city, town, etc., population and percent change in population, the raw water source and type, be it ground or surface water, the volume of treated storage , the treatment processes used, facility location (latitude & longitude), whether the facility had been sampled in the treated water survey, whether the raw water was sampled in the treated water survey and whether the facility has been selected for a site visit in later projects. The information under the treatment processes used and the status of the facility are in codes that are listed at the back of the appendix.

Figures have been generated to summarize the water facilities in the NRBS area based on the collected information. Table 1 gives a listing of the names of the drinking water facilities in the NRBS area. There are 214 licensed drinking water facilities in the study area. Figure 2 illustrates the population served by surface versus ground water and how they are split up in the towns and villages. This figure illustrates that the majority of people in the NRBS area are in the larger centers and most get their drinking water from a surface water source. Figure 3 is a summary of the treatment methods used for ground and surface water sources. The figure demonstrates the variety of treatment processes used. Figure 4 illustrates the locations of the licensed drinking water facilities in the NRBS area while Figure 5 illustrates only those populations greater than 500. These figures show that the facilities are fairly well split between the Peace and Athabasca River basins. The percent change in population is derived from the difference between 1986 and 1991 census data and the historical drinking water demand will reflect this change. The

future population growth and drinking water demand is very site specific depending largely on the economic conditions in the communities.

The information from Appendix C and Appendix E has been use to investigate relationships between water quality and processes used. The most obvious contrast occurs when comparing ground water facilities to surface water facilities. The histogram figures in Appendix C for the parameters TDS, chloroform, and the corrosion indices indicate that ground water facilities produce water that is generally higher in TDS, lower in chloroform and less corrosive than surface water facilities. Further investigation into the effects of other treatment processes had two complicating factors and did not provide significant correlation. First, the performance of processes involved in water treatment are very sensitive to how they are operated. Second, the information on facility processes may not be accurate for samples taken from a facility years ago because facilities change over time due to upgrading and replacing equipment.

3.5 Discussion of Appendix F

Appendix F is a summary of the raw versus treated water data. At certain instances in the treated water survey, raw water samples were collected along with treated water samples. This provides a good opportunity to assess the effects of the treatment processes based on a raw versus treated water comparison. Only those parameters that had samples greater than MDL are included in this summary. The summary consists of a treated water sample followed by the raw water sample and a line showing the difference between raw versus treated. The difference was calculated such that a positive number indicates a decrease in the value of the parameter during treatment. Figure 6 gives an example of the raw water verses treated water concentrations for the parameters turbidity and chloroform. The figure shows that the treatment processes remove turbidity well but that chloroform actually increases (chloroform is a by product of some disinfection processes). This demonstrates that the treatment processes not only removes or lowers parameters but other parameters can be increased as a result of treatment.

4.0 DISCUSSION

As stated previously, the primary purpose of this report is to gather existing data that will give direction to later studies of drinking water quality in the NRBS area. Analysis of existing data has indicated that generally drinking water quality meets all applicable guidelines and regulations. However a number of samples did exceed GCDWQ. The parameter most often exceeded which may be of some health concern was turbidity. Turbidity on its own does not necessarily result in health concerns however it has been shown to be related to the effectiveness of the treatment facility in the removal of microbial contaminants and can also limit disinfection effectiveness. Of the roughly 420 samples analyzed 64 samples had values of turbidity greater than 1 NTU. As mentioned earlier the standards state that turbidity could exceed 1 NTU if it is demonstrated that disinfection is not compromised. Two other parameters of concern which were exceeded

in a few instances were chloroform and 1,2dichlorobenzene. By far most of the samples which exceeded the GCDWQ were for parameters which have aesthetic objectives and most of these were due to the high dissolved solids associated with ground water sources.

The facilities that had a ground water source produced water that was generally higher in TDS lower in chloroform and less corrosive than facilities using surface water. The comparison of treatment processes used to water quality produced did not provide many correlations because of uncertainty in the processes being used at facilities and the sensitivity of facility performance to operational factors.

The compilation of information in this report has identified the following possible directions of further studies on drinking water quality in the NRBS:

1) From the list of GCDWQ parameters that were not included in the treated water survey, taste and odour could be further investigated by asking operators about complaints received.

2) While treatment facilities are required to sample for total and fecal coliforms, independent microbial analysis on raw, treated, and distributed water would provide important insights into the drinking water quality.

3) There is a need to verify the information on the facility inventory and to confirm that the licensed protocol of operation is reflected in the actual operation of the drinking water facilities. An audit of selected sites would confirm the information in the facility inventory and evaluate the operation of the facility.

4) The data on drinking water quality collected by AEP needs to be confirmed by an independent sampling program to reinforce the validity of this data.

5) The selection of sites to be visited will take into account population, historical drinking water quality, and facility characteristics in order that a representative group of facilities is used in the in-depth assessment. While traveling to the sites for in-depth study, smaller sites and watering points should be sampled along the way.

6) In the cases of turbidities greater than 1 NTU, there is need for an evaluation of what was done to determine if disinfection was compromised.

7) Though a thorough and complete evaluation of distribution systems is an unreasonable goal, a much smaller sampling program may be worthwhile.

Table 1: Listing of NRBS Drinking Water Facilities

FACILITY	FACILITY
ANZAC	LITTLE BUFFALO
ATHABASCA	LITTLE SMOKY
ATIKAMEG SCHOOL	LODGEPOLE
BARRHEAD	LOON LAKE
BEAR CANYON	MANNING
BEAR CANYON SCHOOL	MANOLA
BEAVERLODGE	MARIE-REINE
BERWYN	MAYERTHORPE
BEZANSON	MCINNIS (WELL #1)
BEZANSON	MCINNIS (WELL #2)
BEZANSON SCHOOL	MCLENNAN
BISHOP ROUTHIER(PEAVINE)	MILDRED LAKE/LOWER C.
BLUE RIDGE	MILDRED LAKE/UPPER C.
BLUESKY	MITSUE IND. PARK
BONANZA	MOONSHINE LAKE PROV.PK.
BORGEL WHITELAW	NAMPA
BOYLE	NAMPA
BROWNVALE	NEERLANDIA
BRULE	NEW FISH CREEK
BUFFALO HEAD PRAIRIE	NITON JUNCTION
BUFFALO HEAD PRAIRIE SCH	NORTH STAR
CADOMIN	PADDLE PRAIRIE
CADOTTE LAKE	PEACE RIVER
CALLING LAKE	PEACE RIVER AIRPORT
CALLING LAKE P.P.	PEACE RIVER C.C.
CANYON CREEK	PEACE RIVER PULP MILL
CARCAJOU	PEAVINE
CHERHILL	PEERLESS LAKE
CHIP LAKE	PEERLESS LAKE
CHIPEWYAN LAKE	PEERS
CHISHOLM	PEORIA
CLAIRMONT	PIBROCH
CLEARDALE	PICKARDVILLE
COLINTON	PINE SHADOW ESTATES
CONKLIN	PLAMONDON
CONKLIN	PUSKWASKAU
CROOKED CREEK	QUEEN ELIZ.(LAC CARDINAL)
CYNTHIA	RAINBOW LAKE
DAPP	RED EARTH
DEADWOOD SCHOOL	REINWOOD
DEADWOOD WP	RENO
DEBOLT	RIDGE VALLEY
DEER HILL	RIDGE VALLEY
DESMARAIS	ROBB
DIXONVILLE 1	ROCHESTER
DIXONVILLE 2	ROCHFORT BRIDGE
DONNELLY	ROCKY LANE
DR. MARY JACKSON	ROCKY LANE SCHOOL
DUNVEGAN PROV.REC.PK.	ROYCE
EAGLESHAM	RYCROFT
EAST GRIMSHAW WATER CO-OP	SANDY LAKE
EAST MANNING	SANGUDO
EAST PRAIRIE SETTLEMT	SASKATOON ISLAND PROV.PK.
EDSON	SEXSMITH
ELMWORTH	SHELL-PEACE R. INSITU

Table 1: Listing of NRBS Drinking Water Facilities

FACILITY	FACILITY
ENILDA	SIR WINSTON CHURCHILL PP
EUREKA RIVER	SMITH
EVANSBURG	SPIRIT RIVER
EVERGREEN PARK,AGR.SOC.	ST. ISIDORE
FAIRVIEW	STRONG CREEK
FAIRVIEW REGIONAL WATER CO-OP	STURGEON HEIGHT COM.
FALHER	SUNSET HOUSE
FAUST	SUNSET HOUSE
FAWCETT	SWAN HILLS
FOOTNER LAKE	SWEATHOUSE
FORT ASSINIBOINE	T&E TRAILER PARK
FORT CHIPEWYAN	TANGENT
FORT MACKAY	TEEPEE CREEK
FORT MCMURRAY	THREE CREEKS
FORT VERMILION	THUNDER LAKE PROV.PK.
FOX CREEK	TOMKINS LANDING
GIFT LAKE	TOMPKINS LANDING SCHOOL
GIROUXVILLE	TRIPLE L T.P.
GOODWIN	TROUT LAKE
GRANDE CACHE	TROUT LAKE (KATERI)
GRANDE PRAIRIE	VALHALLA
GRANDE PRAIRIE	VALLEYVIEW
GRASSLAND	VALLEYVIEW
GREEN COURT	WABASCA
GRIFFIN CREEK	WAGNER
GRIMSHAW	WANDERING RIVER
GROUARD	WANHAM
GUY	WARRENSVILLE
HARMON VALLEY	WATINO
HAWK HILLS	WEBERVILLE (#1)
HIGH LEVEL	WEBERVILLE (#2)
HIGH PRAIRIE	WEMBLEY
HIGH PRAIRIE AIRPORT	WESTLOCK
HIGH PRAIRIE NW CO-OP	WEYERHAEUSER GRANDE CACHE OP.
HILLIARD BAY PROV. PK	WEYERHAEUSER GRANDE PRAIRIE OP.
HILLTOP ESTATES	WHITE GULL
HINES CREEK	WHITECOURT
HINTON	WHITELAW
HOTCHKISS	WHITELAW SPRING
HYTHE OFF/LIB	WIDEWATER
JANVIER	WILDWOOD
JARVIE	WILLIAMSON PROV.PK.
JASPER NATIONAL PARK	WILLOW GROVE T.P.(HYTHE)
JEAN COTE	WINAGAMI LAKE P.P.
JOUSSARD	WOKING
KEG RIVER	WORSLEY
KINUSO	YOUNG'S POINT PROV.PK.
LA CRETE	ZAMA
LA GLACE	ZAMA
LAC LA BICHE	
LITTLE BUFFALO	

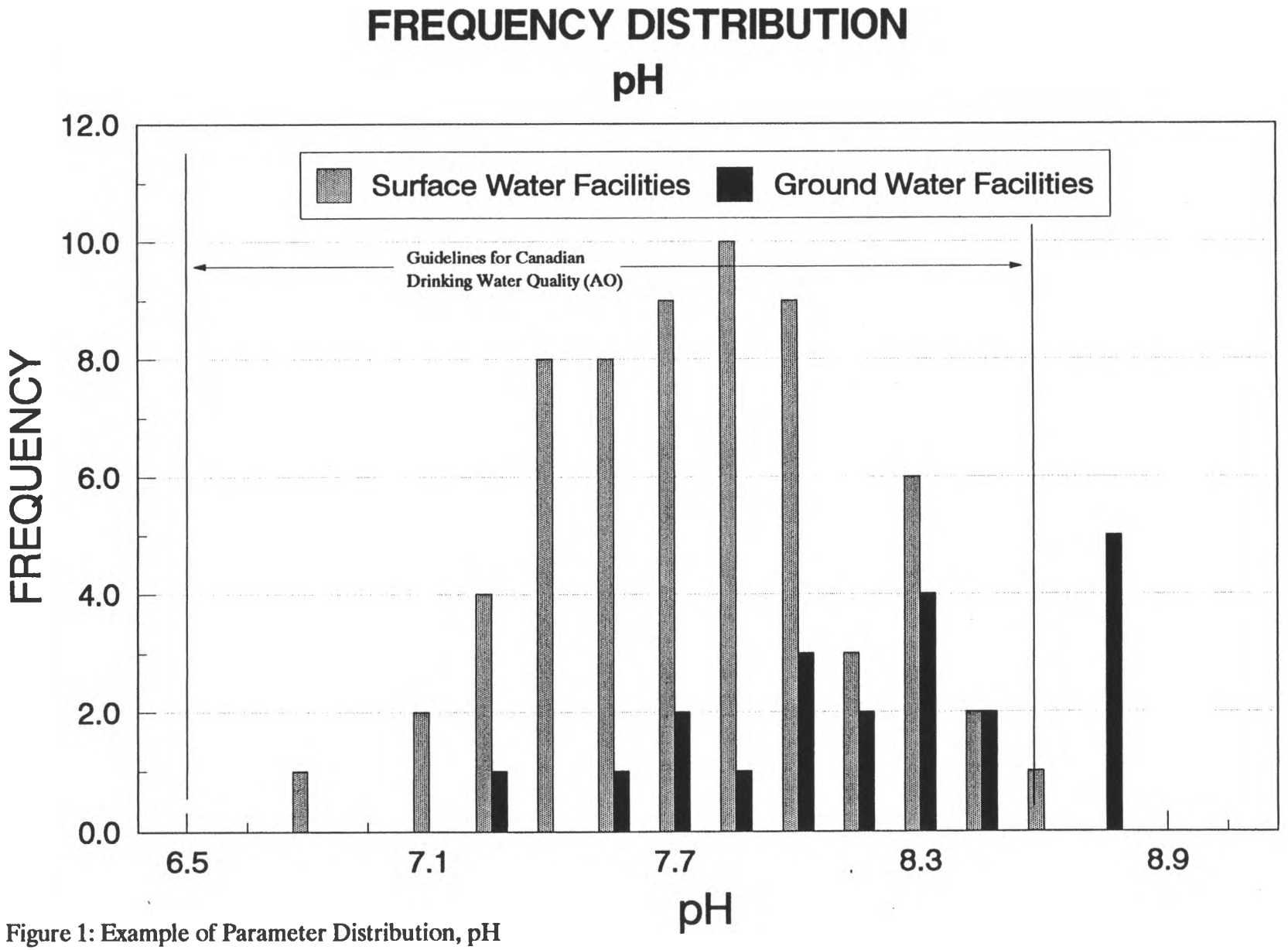

Figure 1: Example of Parameter Distribution, pH

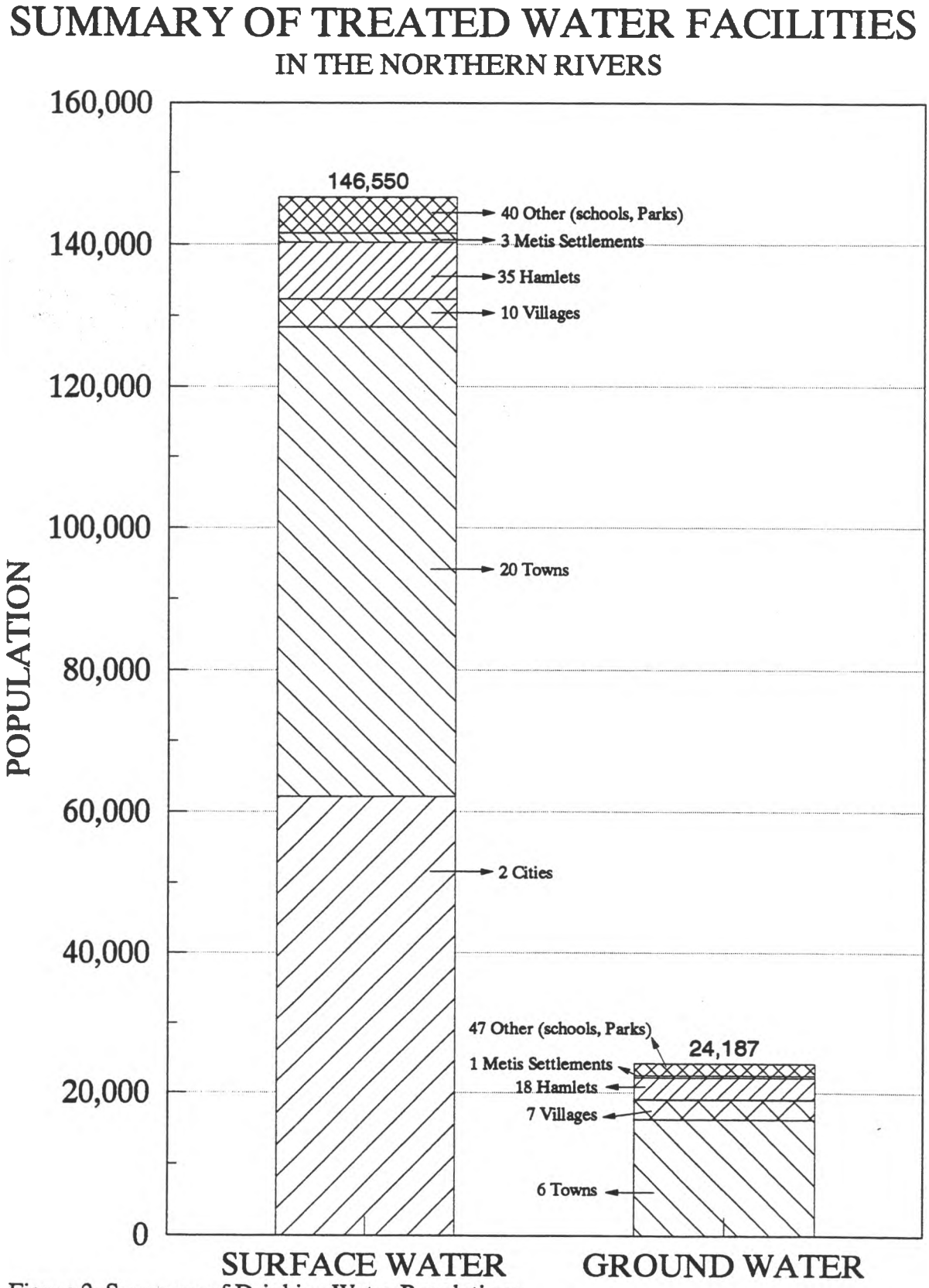

Figure 2: Summary of Drinking Water Populations

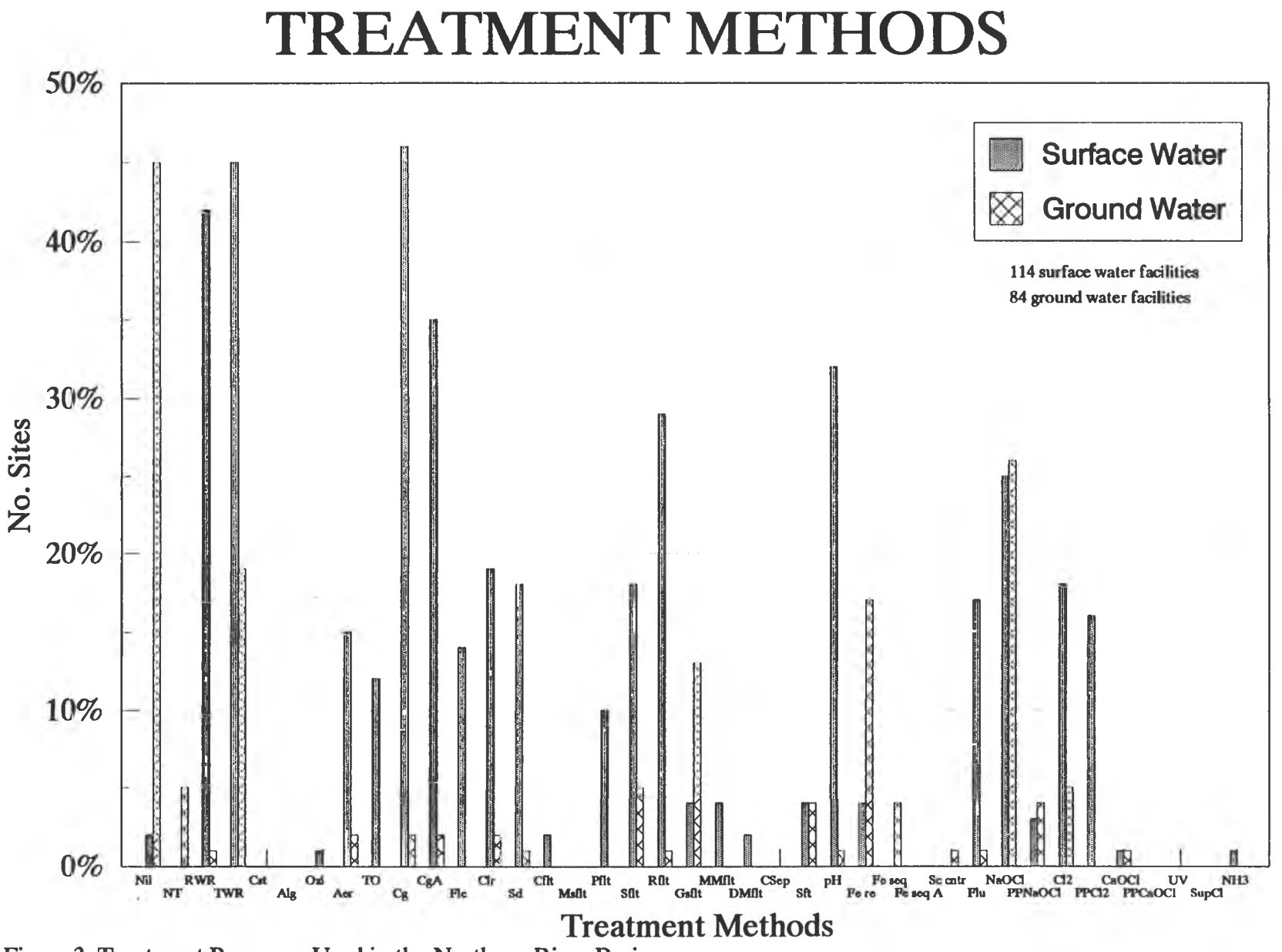

Figure 3: Treatment Processes Used in the Northern River Basin

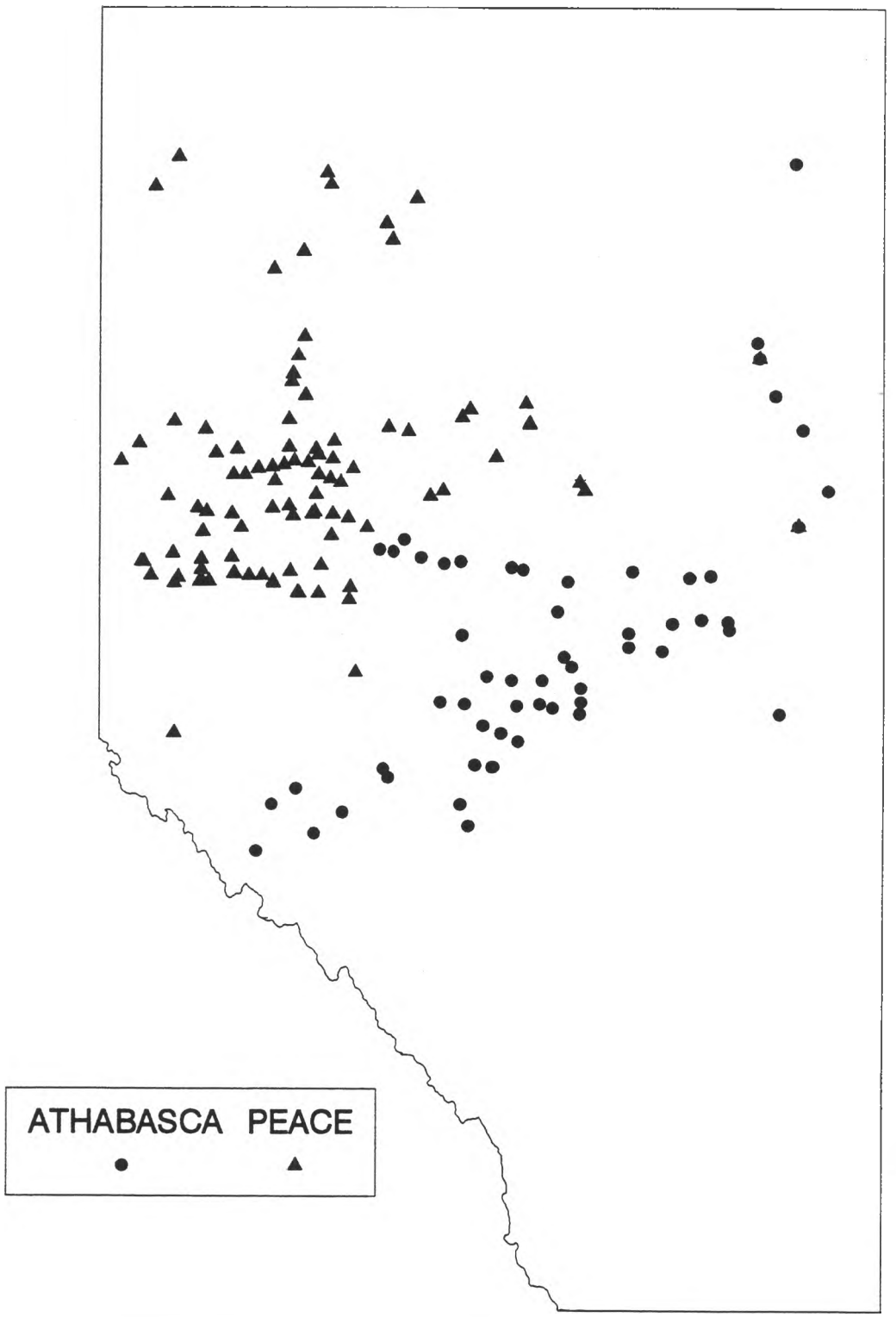

Figure 4: Map Indicating Alberta's Licensed Drinking Water Facilities in NRB

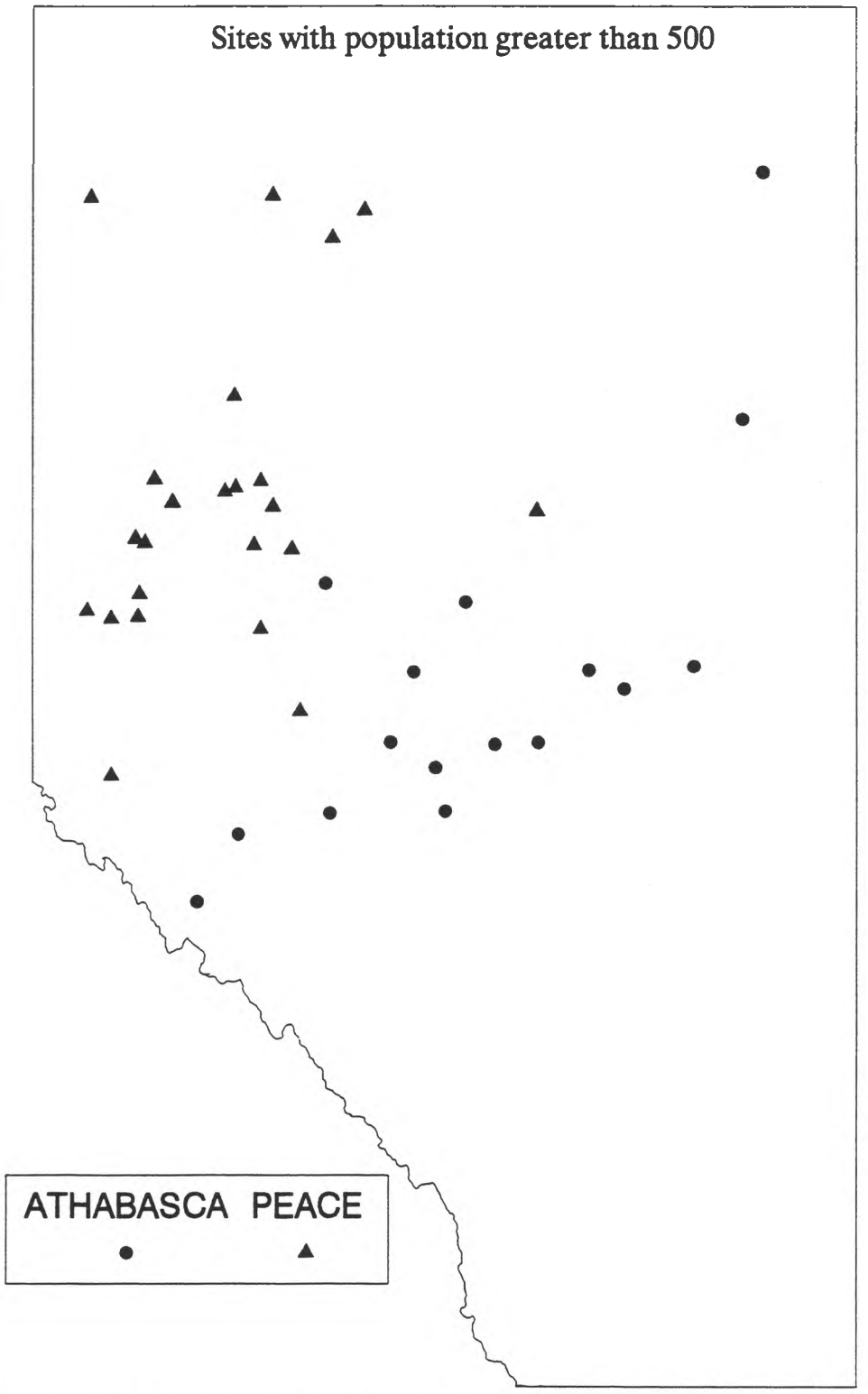

Figure 5: Alberta's Licensed Drinking Water Facilities in NRB with pop. > 500

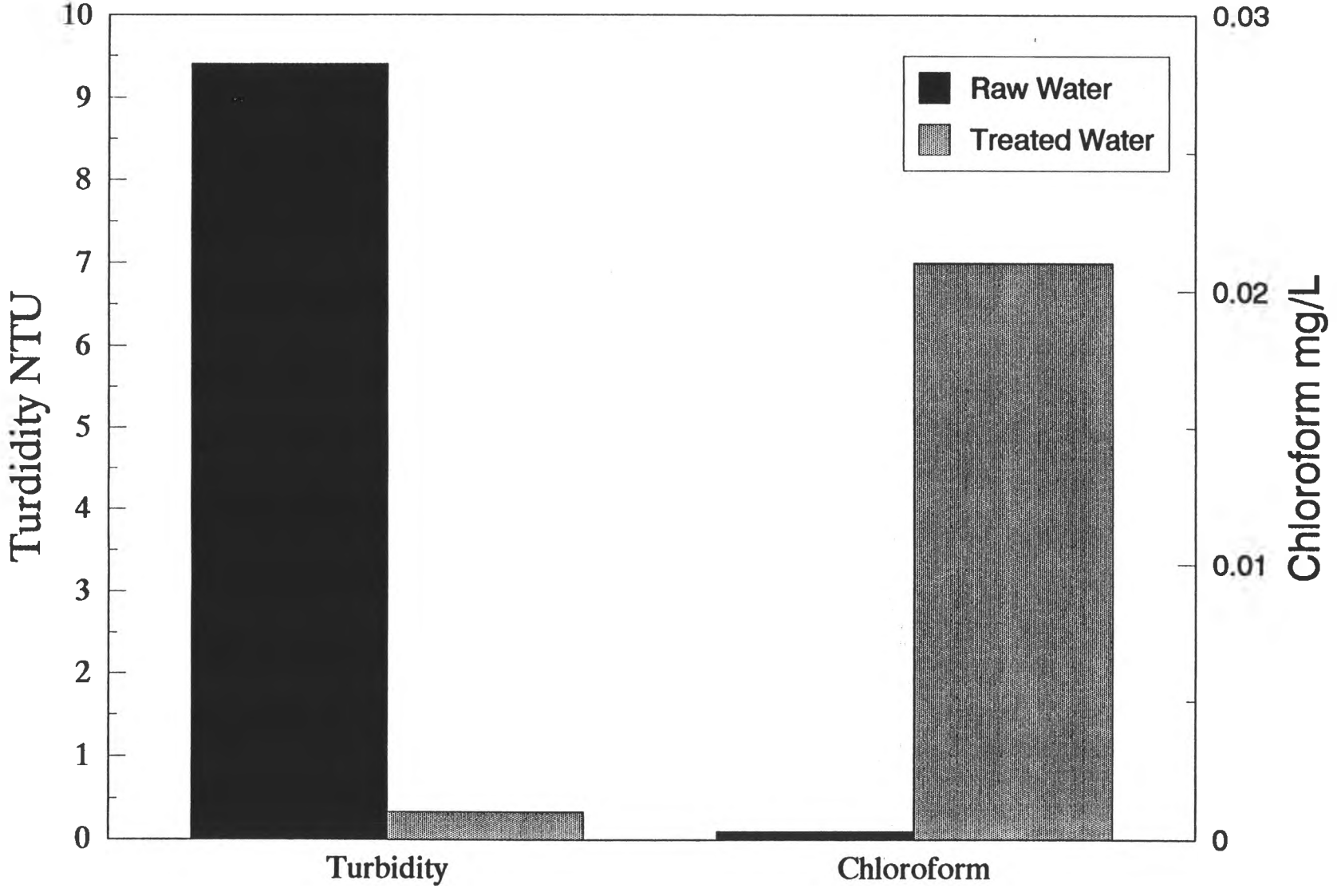

Figure 6: Example of Raw Vs Treated Water Quality for Turbidity and Chloroform

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REFERENCES

Alberta Environment. 1988. Standards and Guidelines For Municipal Water Supply, Wastewater. and Storm Drainage Facilities. Edmonton Alberta.

Federal-Provincial Subcommittee on Drinking Water of the Federal-Provincial Advisory Committee on Environmental and Occupational Health. 1993. Guidelines for Canadian Drinking Water Quality. Ottawa, Ontario.

Prince D.S. 1993 Evaluation of Lagoon Treatment in Alberta. M.Sc. thesis, Univ. of Alberta, Edmonton.

APPENDIX A: TERMS OF REFERENCE

REVIEW AND SYNTHESIS OF EXISTING INFORMATION ON CONSUMPTIVE USE OF DRINKING WATER AND AVAILABLE DRINKING WATER QUALITY DATA

Terms of Reference

The quality of drinking water is primarily dependent on two factors which are the raw water quality and the treatment processes used in during treatment. The first step required to try to assess drinking water quality in the Northern River Basins is the documentation of treatment facilities located in the basins and the processes they use, as well as obtaining a preliminary overview of raw water used by these facilities and drinking water quality produced by them. This can be accomplished by review and synthesis of existing data. Alberta Environment has a large information base on drinking water use, raw and treated water quality and treatment facilities with in the basins. This information base includes an inventory of facility processes and capabilities as well as performance data. In addition various groups have completed a number of special drinking water studies relevant to the NRBS. The Municipal Branch of Alberta Environment has agreed to make all of this information available for the NRBS.

Specific tasks are outlined below.

1. Collection of all pertinent data on water treatment facilities, water use and drinking water quality within the Northern Rivers Basins.

2. Based on the form of available information, methods of synthesis and analysis will be developed that ensure the data will analyzed in a sound scientific and statistical manner. In doing this all available data will be critically assessed to determine its scientific merit.

3. Development of an inventory of treatment facilities in the Northern River Basins. This will include size of facilities and all processes used.

4. Analysis of drinking water use within the basins. The analysis will include evaluation of water use trends and population trends such that future drinking water consumption can be determined.

5. Analysis of raw and drinking water quality for each facility. Trends in this data will be evaluated to determine future water quality.

6. Based on the results of the analysis of water quality and the inventory of processes at each facility, relations will be developed between drinking water quality and treatment processes used.

7. Based on result of analysis of available data, a number of typical water treatment facilities will be selected that can be used for more in-depth studies for other proposed projects. Typical facilities will be selected based on location, facility size, treatment processes used and raw water quality.

8. In all portions of this study any deficiency in available data or information will be determined to define additional needs for future studies.

9. Synthesis of results a concise and usable manner.

APPENDIX B: SUMMARY OF SITES IN THE TREATED WATER SURVEY

This Appendix is provided on the disk bound as the last page of this report because a printed copy of the data would be prohibitively large.

The disk comprising this Appendix contains three files, using 190,604 bytes.

1. INSTALL.BAT; being 80 bytes in size.
2. TWSSITES.EXE; being 190,028 bytes in size.
3. DISCLAIM.TXT; being 496 bytes in size.

To install the database copy the three files on this disk to a directory on your hard drive and type install.bat. The result will be 11 files totalling 3,381,676 bytes. To use these files requires familiarity with dBASE IV and MS-DOS.

The data in these files cover the entire province of Alberta; sites in the NRBS area are identified in Table 1 (page 10) of this report as well as in Appendix E. The data in these files was compiled from the Treated Water Survey, which was available to the public from Alberta Environmental Protection.

There is no warranty expressed or implied for the use of this database; the Northern River Basins Study does not guarantee the accuracy of the data. The NRBS does not assume any liability for actions or consequences resulting from the use of the data; individuals using this database do so entirely at their own risk. The NRBS will not update the data except as deemed necessary for its own purposes.

APPENDIX C: SUMMARY OF PARAMETERS IN THE TREATED WATER SURVEY

PARAMETER	Guidelines for Canadian Drinking Water Quality			Units	MDL	# Samples Taken	# Sites Sampled	# Samples > MDL	# Sites >MDL	Average Values > MDL	Upper 95% Limit > MDL	Lower 95% Limit > MDL
	MAC	IMAC	AO									
ROUTINE PARAMETERS & HEAVY METALS												
pH			6.5-8.5	pH units	NA	424	85	424	85	7.79	8.67	7.00
Iron			0.3	mg/L	0.01 - 0.05	425	85	358	83	0.06	0.38	0.01
Calcium				mg/L	1.0	424	85	423	85	35.73	168.40	7.58
Hardness Total				mg/L	5.0	424	85	423	85	137.25	691.90	27.23
Potassium				mg/L	0.2	424	85	424	85	2.95	17.91	0.49
NO_2 +NO_3	10			mg/L	0.005 - 0.02	424	85	335	82	0.05	0.53	0.005
Floride	1.5			mg/L	0.01 - 0.05	424	85	421	85	0.20	1.62	0.02
Sulfate			500	mg/L	3 - 5	424	85	413	83	53.88	439.46	6.61
Alkalinity				mg/L	5.0	424	85	423	85	157.61	645.76	38.47
TC (partic)				Partic	0.01 - 0.02	331	83	280	75	0.23	1.37	0.04
Turbidity	1		5	NTU	0.04 - 0.1	389	81	359	79	0.63	4.70	0.08
Conductivity				mg/L		424	85	424	85	507.04	1488.89	172.67
Total Dissolved Solids			500	mg/L		424	85	424	85	293.20	951.00	90.40
Manganese			0.05	mg/L	0.001 - 0.008	425	85	346	81	0.02	0.19	0.00
Sodium			200	mg/L	1.0	424	85	418	85	27.39	307.90	2.44
Silica				mg/L	0.1 - 0.5	424	85	424	85	3.61	21.92	0.59
Nitrite	3.2			mg/L	0.001 - 0.005	424	85	224	72	0.00	0.02	0.00
Cloride			250	mg/L	0.5 - 1.0	424	85	415	82	7.47	36.50	1.53
Bicarbonate				mg/L		424	85	424	85	191.00	773.75	47.15
DOC				mg/L	0.2 - 0.4	420	84	411	84	6.79	32.98	1.40
DIC				mg/L		420	84	420	84	37.01	150.95	9.08
Arsenic		0.025		mg/L	0.0001	425	85	20	20	0.00046	0.018	0.00001
Boron		5		mg/L	0.001 - 0.002	411	84	383	84	0.05	0.51	0.01
Copper			1	mg/L	0.001	425	85	417	85	0.02	0.19	0.0028
Cadmium	0.005			mg/L	0.001	425	85	194	68	0.0017	0.0041	0.0007
Zinc			5	mg/L	0.001	425	85	366	85	0.008	0.064	0.0010
Chromium	0.05			mg/L	0.001	425	85	355	80	0.0029	0.0069	0.0012
Vanadium				mg/L	0.002	425	85	246	74	0.0034	0.0072	0.0016
Aluminum				mg/L	0.002 - 0.02	425	85	373	71	0.10	1.37	0.007
TN (partic)				Partic	0.020	329	82	133	60	0.04	0.14	0.012
Mercury	0.001			mg/L	0.00010	419	85	27	18	0.00016	0.00039	0.00007
Selenium	0.01			mg/L	0.00010	425	85	90	40	0.00012	0.00022	0.00006
Cobalt				mg/L	0.001	425	85	99	54	0.0015	0.0037	0.0006
Nickel				mg/L	0.001	425	85	367	82	0.0036	0.0095	0.0013
Lead	0.01			mg/L	0.002	425	85	71	43	0.0030	0.0062	0.0015
Magnesium				mg/L	1.0	424	85	417	81	12.86	50.60	3.27
Beryllium				mg/L	0.001	425	85	1	1	0.0010		
Molybdenum				mg/L	0.001	425	85	249	76	0.0024	0.0060	0.0010
Barium	1			mg/L	0.001	425	85	425	85	0.050	0.18	0.014
Total Colour			15	TCU	1.0	19	16	15	13	4.58	22.38	0.94
Carbonate				mg/L	1.0	14	11	13	10	6.9	65	0.72
TKN				mg/L	0.01	60	42	60	42	0.36	2.4	0.06
NH3_N				mg/L	0.001	59	41	58	41	0.040	0.92	0.0017
T_PHOS				mg/L	0.001	52	36	47	33	0.008	0.08	0.0007
COD				mg/L	4	8	6	6	5	11	37	3.2
Cyanide	0.2			mg/L	0.001	43	30	18	15	0.0023	0.0053	0.0010

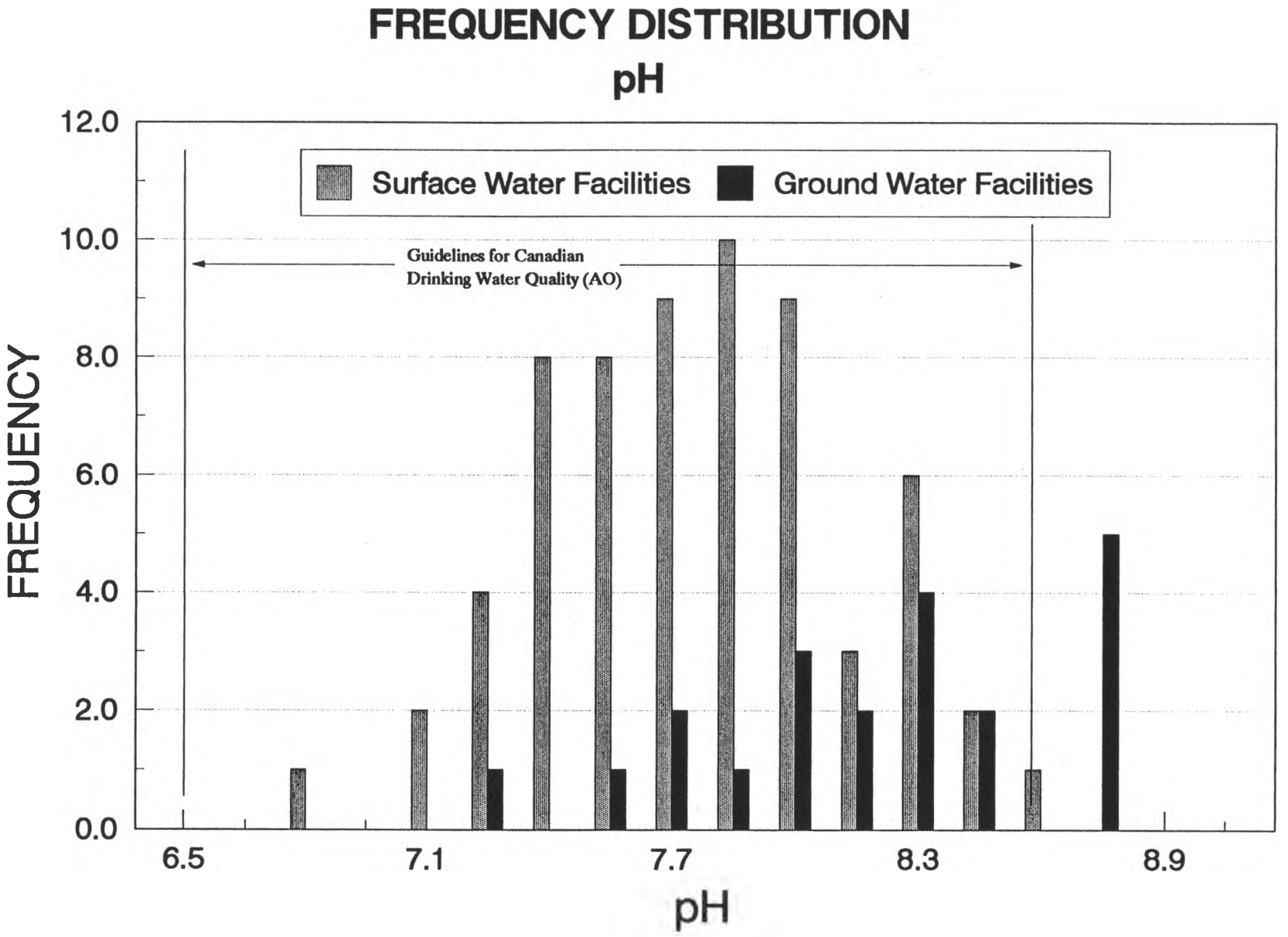
PARAMETER	Guidelines for Canadian Drinking Water Quality			Units	MDL	# Samples Taken	# Sites Sampled	# Samples > MDL	# Sites >MDL	Average Values > MDL	Upper 95% Limit > MDL	Lower 95% Limit > MDL
	MAC	IMAC	AO									
CORROSION INDICES												
Langelier Saturation Index					NA	423	85	423	85	-0.39	0.73	-1.52
Aggressive Index					NA	423	85	423	85	11.9	13.1	10.8
Larson's Ratio					NA	411	83	411	83	0.11	0.32	-0.10
VOLITILE COMPOUNDS												
BENZENE	0.005			mg/L	0.001	456	84	6	5	0.0020	0.0044	0.0009
BROMOCHLOROMETHANE				mg/L	0.001	456	84	1	1	0.0030		
BROMODICHLOROMETHANE				mg/L	0.001	456	84	257	67	0.0034	0.015	0.0008
BROMOFORM	0.35 (THMs)			mg/L	0.005	456	84	5	4	0.0067	0.044	0.0010
BROMOMETHANE				mg/L	0.001	456	84	1	1	0.0060		
CARBONTETRACHLORIDE	0.005			mg/L	0.001	456	84	0	0			
CHLOROBENZENE	0.08			mg/L	0.001	456	84	0	0			
CHLOROETHANE				mg/L	0.001	456	84	2	2	0.0024	0.0043	0.0014
2-CHLOROETHOXYETHYLENE				mg/L	0.004	456	84	0	0			
CHLOROFORM	0.35 (THMs)			mg/L	0.001	456	84	409	77	0.035	0.530	0.0024
DIBROMOCHLOROMETHANE				mg/L	0.001	456	84	25	13	0.0027	0.020	0.0004
DIBROMOMETHANE				mg/L	0.001	456	84	0	0			
1,2-DICHLOROBENZENE	0.2		0.003	mg/L	0.001	456	84	1	1	0.0010		
1,3-DICHLOROBENZENE				mg/L	0.001	456	84	1	1	0.0010		
1,4-DICHLOROBENZENE	0.005		0.001	mg/L	0.001	456	84	13	5	0.0019	0.0041	0.0009
1,1-DICHLOROETHANE				mg/L	0.001	456	84	0	0			
1,2-DICHLOROETHANE		0.005		mg/L	0.001	456	84	0	0			
1,1-DICHLOROETHYLENE				mg/L	0.001	456	84	0	0			
trans-1,2-DICHLOROETHYLENE				mg/L	0.001	456	84	0	0			
1,2-DICHLOROPROPANE				mg/L	0.001	456	84	0	0			
cis-1,3-DICHLOROPROPYLENE				mg/L	0.003	456	84	0	0			
trans-1,3-DICHLOROPROPYLENE				mg/L	0.003	456	84	0	0			
ETHYLBENZENE			0.0024	mg/L	0.001	456	84	0	0			
METHYLENE CHLORIDE				mg/L	0.02	456	84	4	4	0.0066	0.47	0.0001
STYRENE				mg/L	0.001	456	84	0	0			
1,1,2,2-TETRACHLOROETHANE				mg/L	0.001	456	84	0	0			
TETRACHLOROETHYLENE				mg/L	0.003	456	84	0	0			
TOLUENE			0.024	mg/L	0.001	456	84	4	4	0.0017	0.0062	0.0005
1,1,1-TRICHLOROETHANE				mg/L	0.001	456	84	1	1	0.0090		
1,1,2-TRICHLOROETHANE				mg/L	0.001	456	84	0	0			
TRICHLOROFLUOROMETHANE				mg/L	0.001	456	84	0	0			
TRICHLOROETHYLENE	0.05			mg/L	0.001	456	84	2	2	0.078	0.115	0.053
VINYL CHLORIDE				mg/L	0.03	456	84	0	0			
o-XYLENE			0.3 (all xylene)	mg/L	0.001	456	84	1	1	0.0010		
m,p-XYLENE			0.3 (all xylene)	mg/L	0.001	456	84	6	6	0.0016	0.0032	0.0008
1,1,1,2-TETRACHLOROETHANE				mg/L	0.001	456	84	0	0			
1,1-DICHLOROPROPYLENE				mg/L	0.001	456	84	0	0			
1,2,3-TRICHLOROPROPANE				mg/L	0.001	456	84	0	0			
1,2,3-TRICHLOROBENZENE				mg/L	0.001	456	84	0	0			
1,2,4-TRICHLOROBENZENE				mg/L	0.001	456	84	0	0			
1,2,4-TRIMETHYLBENZENE				mg/L	0.001	456	84	0	0			
1,2-DIBROMOETHANE				mg/L	0.001	456	84	0	0			
1,2-DIBROMO-3-CHLOROPROPANE				mg/L	0.001	456	84	0	0			
1,3,5-TRIMETHYLBENZENE				mg/L	0.001	456	84	0	0			

PARAMETER	Guidelines for Canadian Drinking Water Quality			Units	MDL	# Samples Taken	# Sites Sampled	# Samples > MDL	# Sites >MDL	Average Values > MDL	Upper 95% Limit > MDL	Lower 95% Limit > MDL
	MAC	IMAC	AO									
1,3-DICHLOROPROPANE				mg/L	0.001	456	84	0	0			
2,2-DICHLOROPROPANE				mg/L	0.001	456	84	0	0			
2-CHLOROTOLUENE				mg/L	0.001	456	84	0	0			
4-CHLOROTOLUENE				mg/L	0.001	456	84	0	0			
BROMOBENZENE				mg/L	0.001	456	84	0	0			
cis-1,2-DICHLOROETHYLENE				mg/L	0.001	456	84	0	0			
HEXACHLOROBUTADIENE				mg/L	0.003	456	84	0	0			
ISOPROPYLBENZENE				mg/L	0.001	456	84	0	0			
n-BUTYLBENZENE				mg/L	0.001	456	84	0	0			
n-PROPYLBENZENE				mg/L	0.001	456	84	0	0			
NAPHTHANLENE				mg/L	0.001	456	84	0	0			
p-ISOPROPYLTOLUENE				mg/L	0.001	456	84	0	0			
sec-BUTYLBENZENE				mg/L	0.001	456	84	0	0			
tert-BUTYLBENZENE				mg/L	0.001	456	84	0	0			
SEMIVOLITILE COMPOUNDS												
BENZOIC ACID				mg/L	0.002	461	84	0	0			
4-CHLORO-3-METHYLPHENOL				mg/L	0.001	461	84	0	0			
2-CHLOROPHENOL				mg/L	0.002	461	84	0	0			
2,4-DICHLOROPHENOL	0.9		0.0003	mg/L	0.001	461	84	0	0			
2,4-DIMETHYL PHENOL				mg/L	0.002	461	84	0	0			
2-METHYL-4,6-DINITROPHENOL				mg/L	0.001	461	84	0	0			
2,4-DINITROPHENOL				mg/L	0.001	461	84	0	0			
HEXADECANOIC ACID				mg/L	0.003	461	84	25	19	0.0046	0.0101	0.0021
2-NITROPHENOL				mg/L	0.001	461	84	0	0			
4-NITROPHENOL				mg/L	0.001	461	84	0	0			
PENTACHLOROPHENOL	0.06		0.03	mg/L	0.001	461	84	0	0			
PHENOL				mg/L	0.001	461	84	0	0			
2,4,5-TRICHLOROPHENOL				mg/L	0.001	461	84	0	0			
2,4,6-TRICHLOROPHENOL	0.005		0.002	mg/L	0.001	461	84	0	0			
ACENAPHTHENE				mg/L	0.001	461	84	0	0			
ACENAPHTHYLENE				mg/L	0.001	461	84	0	0			
ANTHRACENE				mg/L	0.001	461	84	0	0			
BENZO(a)ANTHRACENE				mg/L	0.001	461	84	0	0			
BENZO(k)FLUORANTHENE				mg/L	0.001	461	84	0	0			
BENZO(ghi)PERYLENE				mg/L	0.002	461	84	0	0			
BENZO(a)PYRENE	0.00001			mg/L	0.001	461	84	0	0			
CHRYSENE				mg/L	0.001	461	84	0	0			
DIBENZO(ah)ANTHRACENE				mg/L	0.005	461	84	0	0			
FLUORANTHENE				mg/L	0.001	461	84	0	0			
FLUORENE				mg/L	0.001	461	84	0	0			
INDENO(1,2,3-cd)PYRENE				mg/L	0.001	461	84	0	0			
NAPHTHALENE				mg/L	0.001	461	84	0	0			
PERYLENE				mg/L	0.001	461	84	0	0			
PHENANTHRENE				mg/L	0.001	461	84	0	0			
PYRENE				mg/L	0.001	461	84	0	0			
BENZO(b)FLUORANTHENE				mg/L	0.001	461	84	0	0			
2-CHLORONAPHTHALENE				mg/L	0.001	461	84	0	0			
HEXACHLOROBENZENE (Lindane)	0.004			mg/L	0.001	461	84	0	0			
HEXACHLOROBUTADIENE				mg/L	0.005	461	84	0	0			
HEXACHLOROCYCLOPENTADIENE				mg/L	0.001	461	84	0	0			

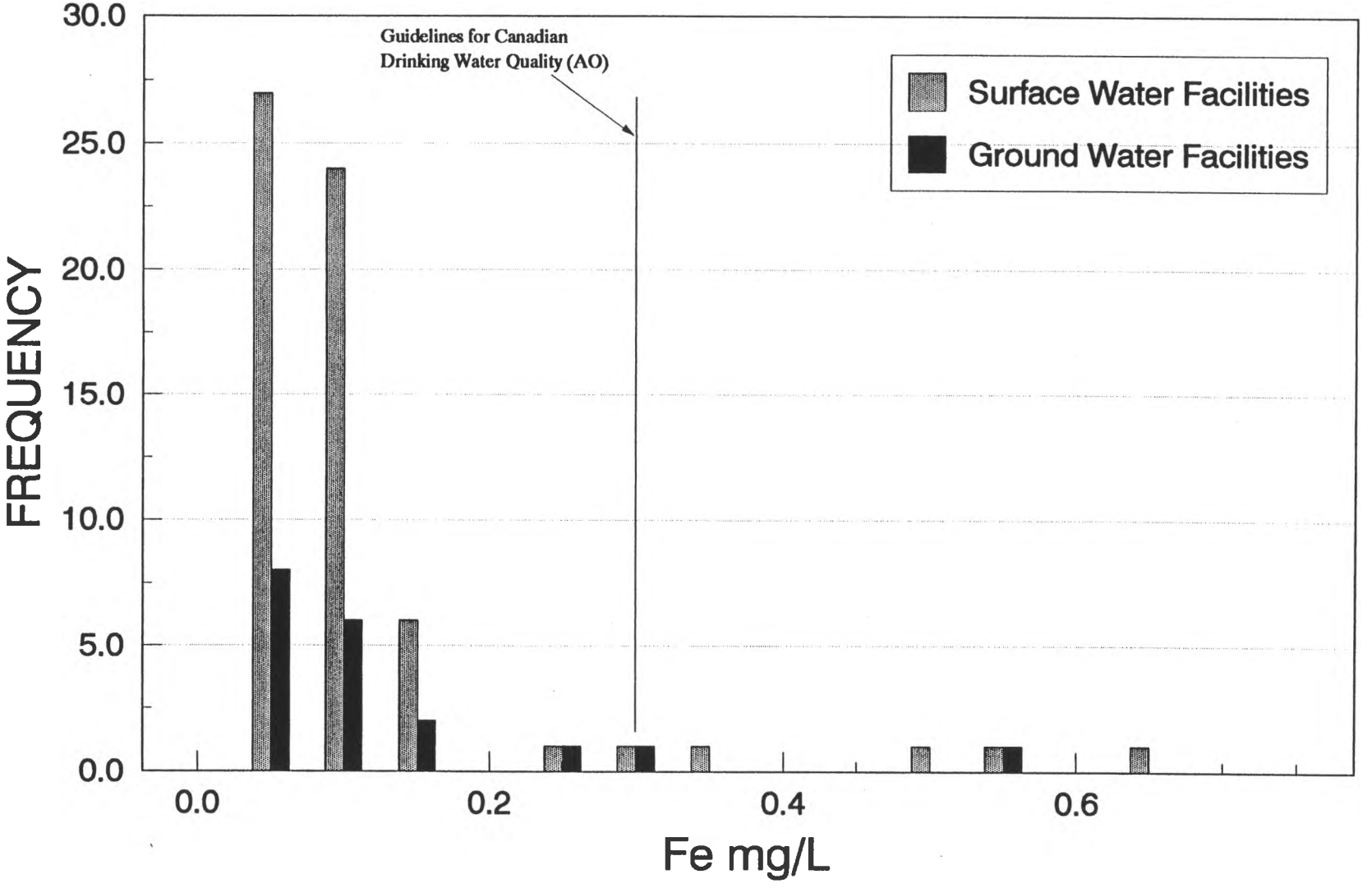
PARAMETER	Guidelines for Canadian Drinking Water Quality			Units	MDL	# Samples Taken	# Sites Sampled	# Samples > MDL	# Sites >MDL	Average Values > MDL	Upper 95% Limit > MDL	Lower 95% Limit > MDL
	MAC	IMAC	AO									
HEXACHLOROETHANE				mg/L	0.005	461	84	0	0			
ISOPHORONE				mg/L	0.001	461	84	0	0			
1,2,4-TRICHLOROBENZENE				mg/L	0.001	461	84	0	0			
BENZIDINE				mg/L	0.002	461	84	0	0			
2,4-DINITROTOLUENE				mg/L	0.001	461	84	0	0			
2,6-DINITROTOLUENE				mg/L	0.001	461	84	0	0			
1,2-DIPHENYLHYDRAZINE				mg/L	0.001	461	84	0	0			
NITROBENZENE				mg/L	0.001	461	84	1	1	0.0010		
N-NITROSODIPHENYLAMINE				mg/L	0.001	461	84	0	0			
N-NITROSO-DI-n-PROPYLAMINE				mg/L	0.002	461	84	0	0			
4-BROMOPHENYL PHENYL ETHER				mg/L	0.001	461	84	0	0			
BIS(2-CHLOROETHOXY)METHANE				mg/L	0.001	461	84	0	0			
BIS(2-CHLOROETHYL)ETHER				mg/L	0.001	461	84	0	0			
BIS(2-CHLOROISOPROPYL)ETHER				mg/L	0.001	461	84	0	0			
4-CHLOROPHENYL PHENYL ETHER				mg/L	0.001	461	84	0	0			
BUTYLBENZYLPHTHALATE				mg/L	0.001	461	84	0	0			
DIBUTYLPHTHALATE				mg/L	0.001	461	84	28	18	0.0017	0.0040	0.0007
DIETHYLPHTHALATE				mg/L	0.001	461	84	1	1	0.0030		
DIMETHYLPHTHALATE				mg/L	0.001	461	84	0	0			
DI-n-OCTYLPHTHALATE				mg/L	0.001	461	84	4	2	0.0015	0.0045	0.0005
BIS(2-ETHYLHEXYL)PHTHALATE				mg/L	0.001	461	84	88	26	0.0023	0.0097	0.0006
AROCLOR 1016				mg/L	0.0001	461	84	0	0			
AROCLOR 1221				mg/L	0.0002	461	84	0	0			
AROCLOR 1232				mg/L	0.0001	461	84	0	0			
AROCLOR 1242				mg/L	0.00005	461	84	0	0			
AROCLOR 1248				mg/L	0.00005	461	84	0	0			
AROCLOR 1254				mg/L	0.00005	461	84	0	0			
AROCLOR 1260				mg/L	0.0001	461	84	0	0			
AROCLOR 1262				mg/L	0.0001	461	84	0	0			
AROCLOR 1268				mg/L	0.00005	461	84	0	0			
HERBICIDES & PESTICIDES												
Alachlor				mg/L	0.00004	448	83	0	0			
alpha-Chlordane				mg/L	0.00002	448	83	0	0			
gamma-Chlordane				mg/L	0.000005	448	83	0	0			
Captan				mg/L	0.00015	448	83	0	0			
Dacthal (Chlorthal Methyl)				mg/L	0.00001	448	83	0	0			
o,p'-DDD				mg/L	0.00001	448	83	0	0			
p,p'-DDD				mg/L	0.00001	448	83	0	0			
o,p'-DDE				mg/L	0.00001	448	83	0	0			
p,p'-DDE				mg/L	0.00001	448	83	0	0			
o,p'-DDT	0.03 (all DDT)			mg/L	0.00002	448	83	0	0			
p,p'-DDT	0.03 (all DDT)			mg/L	0.00002	448	83	0	0			
Diallate (Avadex)				mg/L	0.0008	448	83	0	0			
Dieldrin	.0007 (aldrin+dieldrin)			mg/L	0.00001	448	83	0	0			
Dursban(Lorsban,Chlorpyrifos)				mg/L	0.000012	448	83	0	0			
alpha-Endosulfan				mg/L	0.00001	448	83	0	0			
beta-Endosulfan				mg/L	0.00001	448	83	0	0			
Endrin				mg/L	0.00001	448	83	0	0			
Heptachlor	0.003 (all heptachlor)			mg/L	0.00001	448	83	0	0			
Heptachlor Epoxide	0.003 (all heptachlor)			mg/L	0.00001	448	83	0	0			

PARAMETER	Guidelines for Canadian Drinking Water Quality			Units	MDL	# Samples Taken	# Sites Sampled	# Samples > MDL	# Sites >MDL	Average Values > MDL	Upper 95% Limit > MDL	Lower 95% Limit > MDL
	MAC	IMAC	AO									
Hexachlorobenzene (HCB)				mg/L	0.000005	448	83	0	0			
alpha-Hexachlorocyclohexane				mg/L	0.00001	448	83	0	0			
beta -Hexachlorocyclohexane				mg/L	0.00001	448	83	0	0			
gamma-Hexachlorocyclohexane				mg/L	0.00001	448	83	0	0			
delta-Hexachlorocyclohexane				mg/L	0.00001	448	83	0	0			
Methoxychlor	0.9			mg/L	0.00003	448	83	0	0			
Mirex				mg/L	0.00002	448	83	0	0			
Perthane				mg/L	0.00025	448	83	0	0			
Ramrod (Propachlor)				mg/L	0.0001	448	83	0	0			
Triallate (Avadex BW)	0.23			mg/L	0.00004	448	83	0	0			
Aspon				mg/L	0.0001	448	83	0	0			
Crufomate (Ruelene)				mg/L	0.0002	448	83	0	0			
Fensulfothion (Dasanit)				mg/L	0.0006	448	83	0	0			
Dichlorovos (Vapona,DDVP)				mg/L	0.00015	448	83	0	0			
DEF				mg/L	0.00025	448	83	0	0			
Demeton (Systox)				mg/L	0.0003	448	83	0	0			
Dimethoate (Cygon)		0.02		mg/L	0.00025	448	83	0	0			
Disulfoton (Di-Syston)				mg/L	0.00015	448	83	0	0			
Ethion				mg/L	0.0001	448	83	0	0			
Fenthion				mg/L	0.00015	448	83	0	0			
Fenitrothion				mg/L	0.00015	448	83	0	0			
Fonofos (Dyfonete)				mg/L	0.00005	448	83	0	0			
Guthion (Azinphos-methyl)	0.02			mg/L	0.0002	448	83	0	0			
Malathion	0.19			mg/L	0.0001	448	83	0	0			
Methyl Parathion				mg/L	0.00015	448	83	0	0			
Methyl Trithion				mg/L	0.0003	448	83	0	0			
Mevinphos (Phosdrin)				mg/L	0.00015	448	83	0	0			
Mocap				mg/L	0.00015	448	83	0	0			
Paraoxon				mg/L	0.00015	448	83	0	0			
Parathion	0.05			mg/L	0.00015	448	83	0	0			
Phorate (Thimet)		0.002		mg/L	0.0001	448	83	0	0			
Fenchlorphos (Ronnel)				mg/L	0.00015	448	83	0	0			
Tetrachlorvinphos (Gardona)				mg/L	0.00015	448	83	0	0			
Atrazine		0.06		mg/L	0.0006	448	83	0	0			
Matacil (Aminocarb)				mg/L	0.0025	448	83	0	0			
Cyanazine		0.01		mg/L	0.0006	448	83	0	0			
Diazinon	0.02			mg/L	0.00005	448	83	0	0			
Prometryne				mg/L	0.0012	448	83	0	0			
Propazine				mg/L	0.0005	448	83	0	0			
Simazine		0.01		mg/L	0.003	448	83	0	0			
Bromacil (Isocil)				mg/L	0.00015	448	83	0	0			
Terbacil				mg/L	0.00025	448	83	0	0			
Trifluralin (Treflan)		0.045		mg/L	0.0001	448	83	0	0			
Dinitramine (Cobex)				mg/L	0.00125	448	83	0	0			
Dinoseb	0.01			mg/L	0.00125	448	83	0	0			
Metribuzin	0.08			mg/L	0.00007	448	83	0	0			
Propanil				mg/L	0.0005	448	83	0	0			
2,4-D		0.1		mg/L	0.0002	448	83	0	0			
2,4,5-T	0.28		0.02	mg/L	0.0002	448	83	0	0			
Picloram (Tordon)		0.19		mg/L	0.0003	448	83	0	0			
Diclofop-methyl (Hoe Grass)	0.009			mg/L	0.0002	448	83	0	0			

PARAMETER	Guidelines for Canadian Drinking Water Quality			Units	MDL	# Samples Taken	# Sites Sampled	# Samples > MDL	# Sites >MDL	Average Values > MDL	Upper 95% Limit > MDL	Lower 95% Limit > MDL
	MAC	IMAC	AO									
Dicamba (Banvel)	0.12			mg/L	0.0002	448	83	0	0			
Silvex				mg/L	0.0003	448	83	0	0			
2,4-DB				mg/L	0.0003	448	83	0	0			
2,4-DP				mg/L	0.0002	448	83	0	0			
MCPA				mg/L	0.002	448	83	0	0			
ALDRIN	.0007 (aldrin+dieldrin)			mg/L	0.00001	448	83	0	0			
KELTHANE_D				mg/L		448	83	0	0			
GCDWQ REGULATED PARAMETERS NOT ANALYSED FOR												
Aldicarb	0.009			mg/L								
Bendiocarb	0.04			mg/L								
Bromoxynil		0.005		mg/L								
Carbaryl	0.09			mg/L								
Carbofuran	0.09			mg/L								
Chlordane	0.007			mg/L								
Chlorpyrifos	0.09			mg/L								
Diquat	0.07			mg/L								
Diuron	0.15			mg/L								
Glyphosate		0.28		mg/L								
Metolachlor		0.05		mg/L								
Nitrilotriacetic acid (NTA)	0.4			mg/L								
odour			Inoffensive									
Paraquat		0.01		mg/L								
Sulphide (as H_2S)			0.05	mg/L								
Taste			Inoffensive									
Temephos		0.28		mg/L								
Temperature			< 15 deg C	deg C								
Terbufos		0.001		mg/L								
2,3,4,6 - tetrachlorophenol	0.1		0.001	mg/L								
Uranium	0.1			mg/L								


FREQUENCY DISTRIBUTION
pH
Surface Water Facilities
Ground Water Facilities
Guidelines for Canadian
Drinking Water Quality (AO)
FREQUENCY
12.0
10.0
8.0
6.0
4.0
2.0
0.0
6.5
7.1
7.7
8.3
8.9
pH

FREQUENCY DISTRIBUTION
Iron (Fe)



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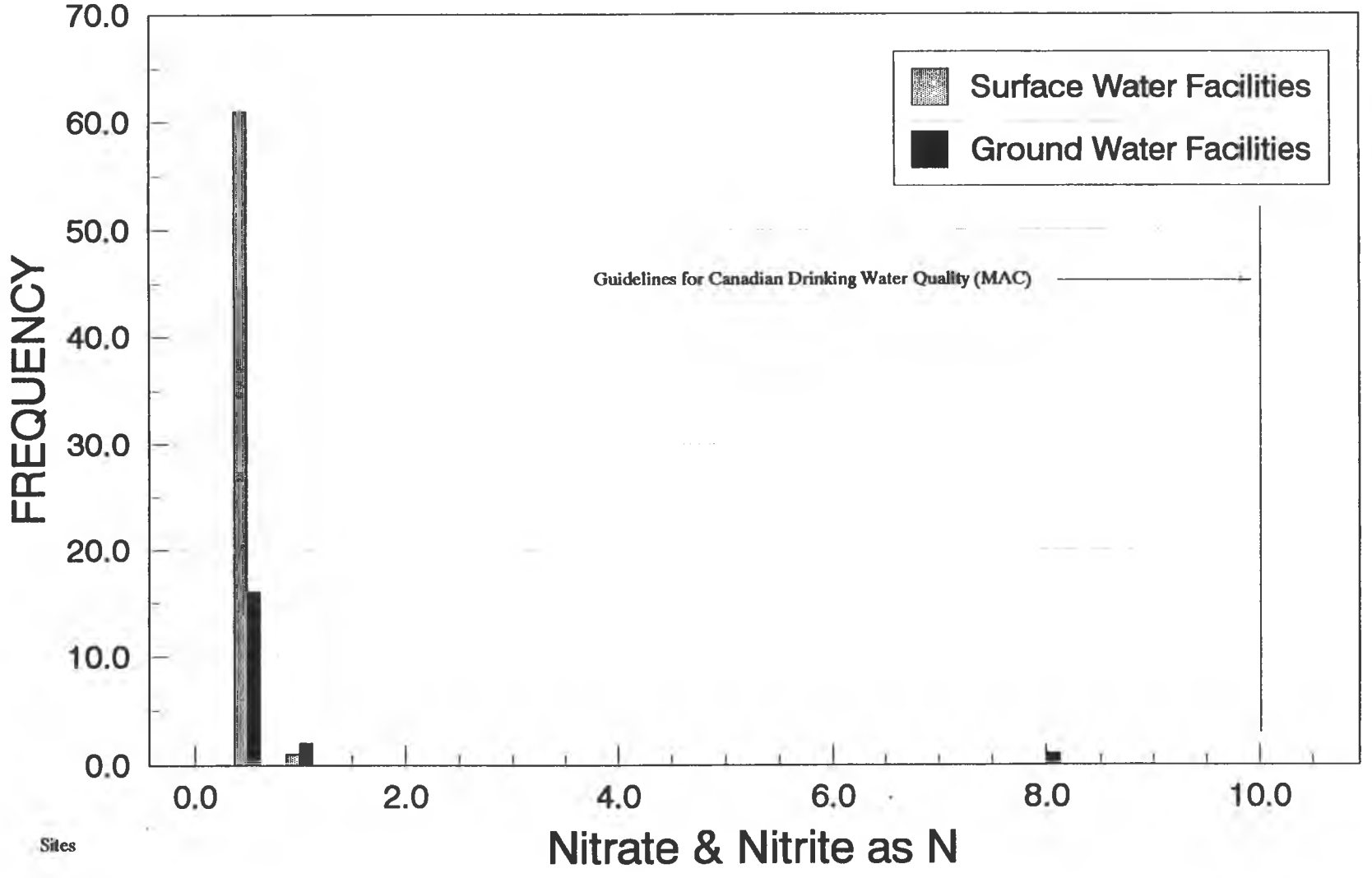
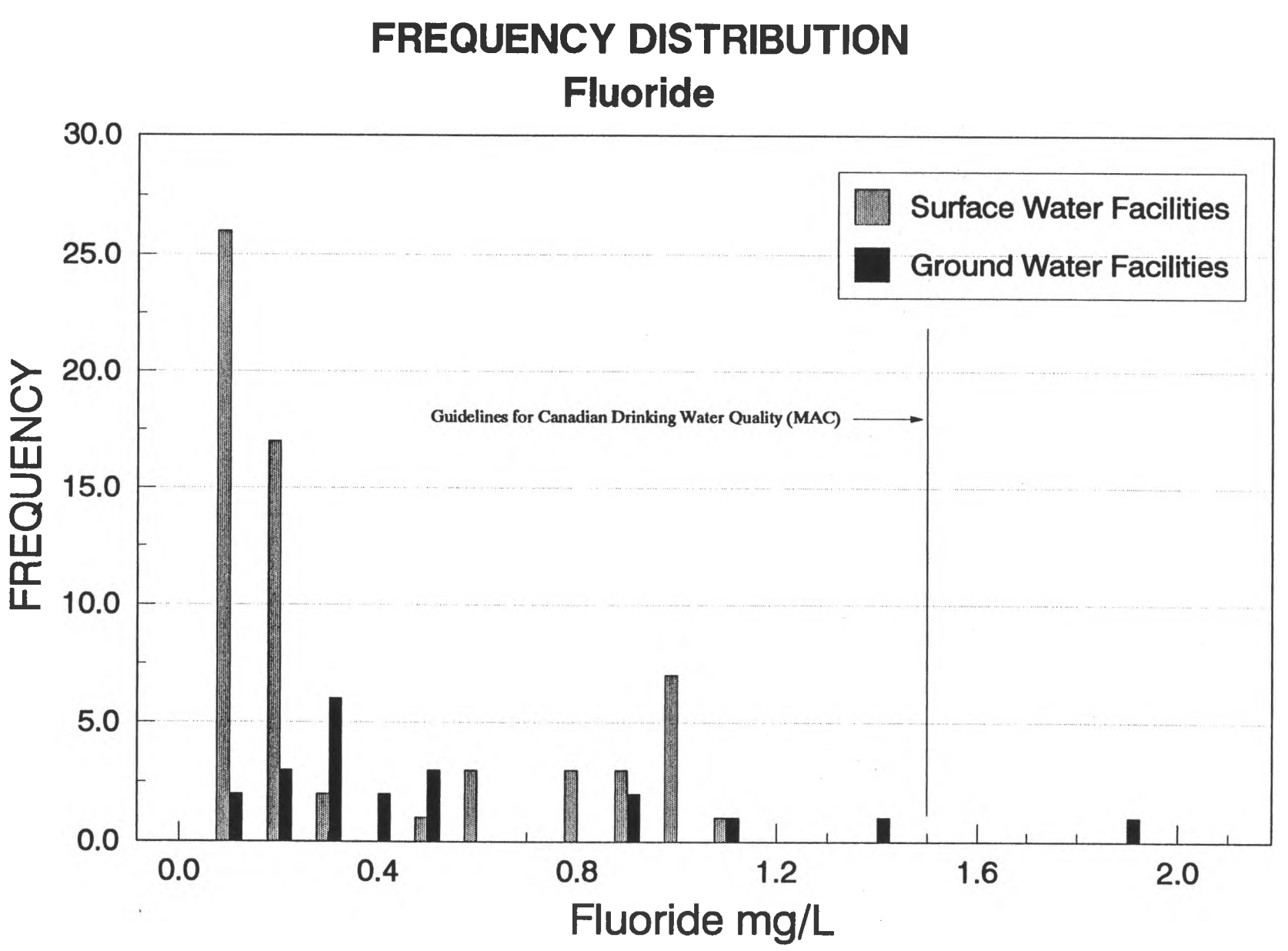
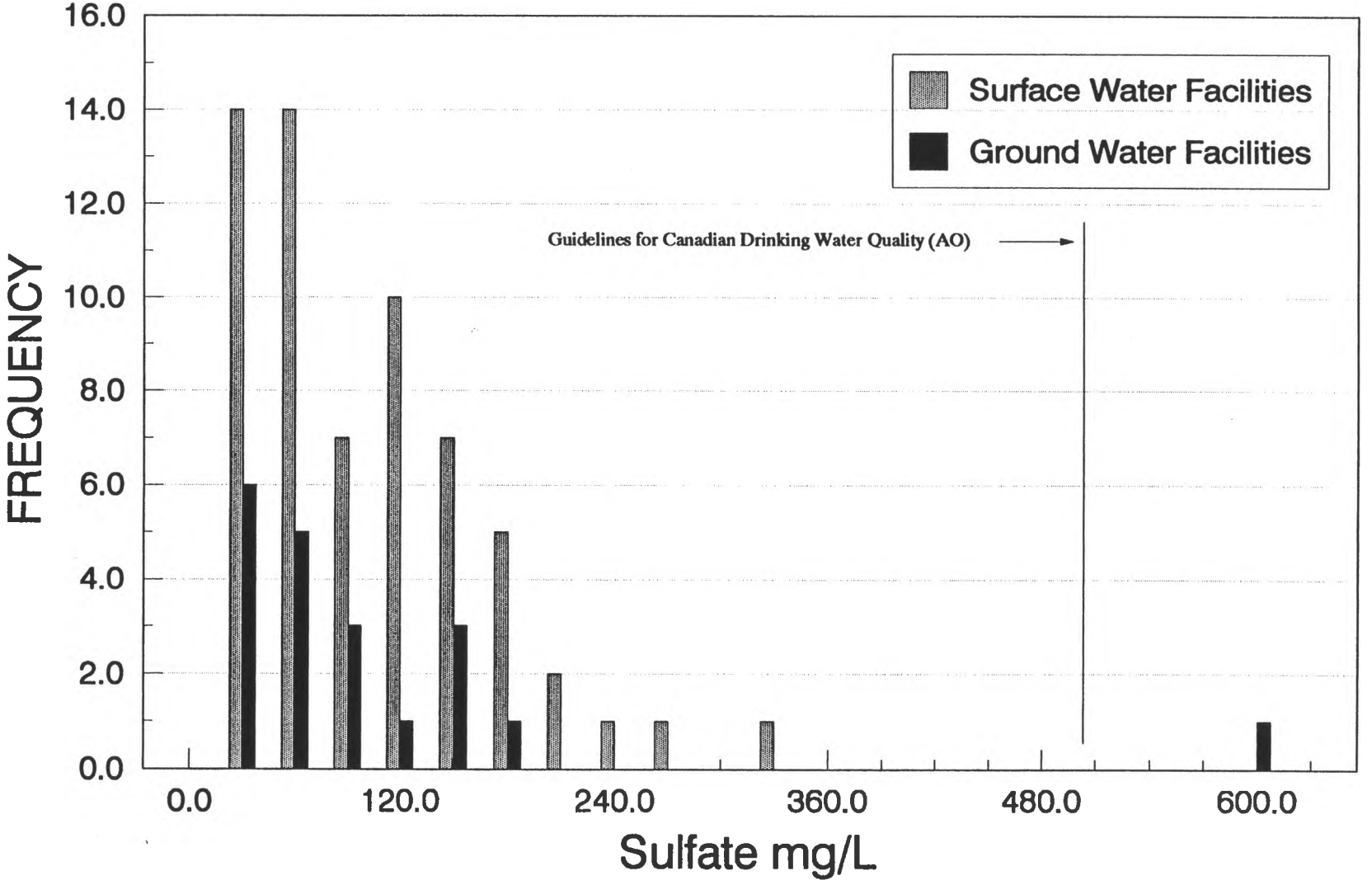
Nitrate & Nitrite




FREQUENCY DISTRIBUTION
Fluoride
30.0
25.0
20.0
15.0
10.0
5.0
0.0
FREQUENCY
Surface Water Facilities
Ground Water Facilities
Guidelines for Canadian Drinking Water Quality (MAC)
0.0
0.4
0.8
1.2
1.6
2.0
Fluoride mg/L

FREQUENCY DISTRIBUTION
Sulfate



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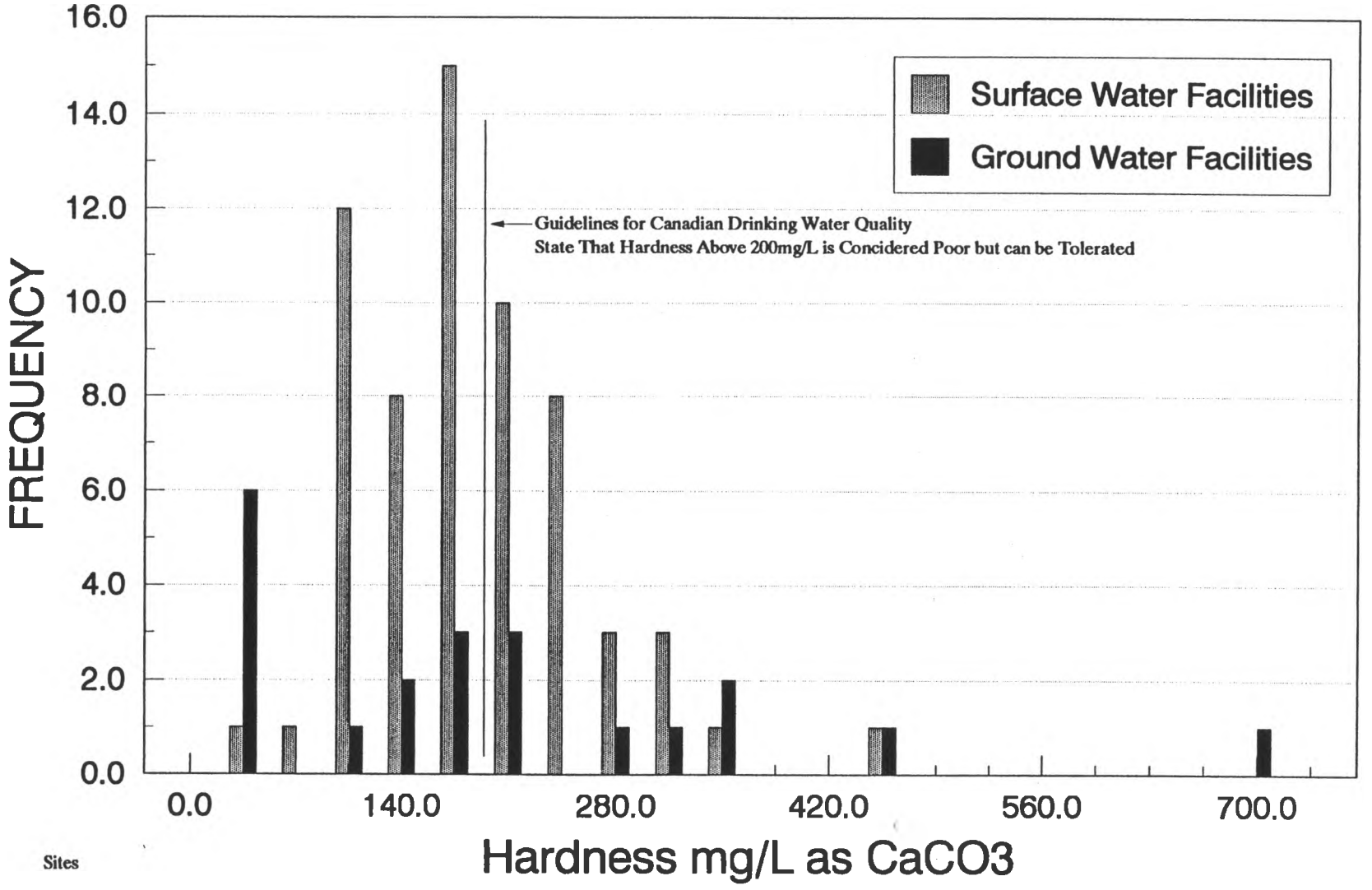
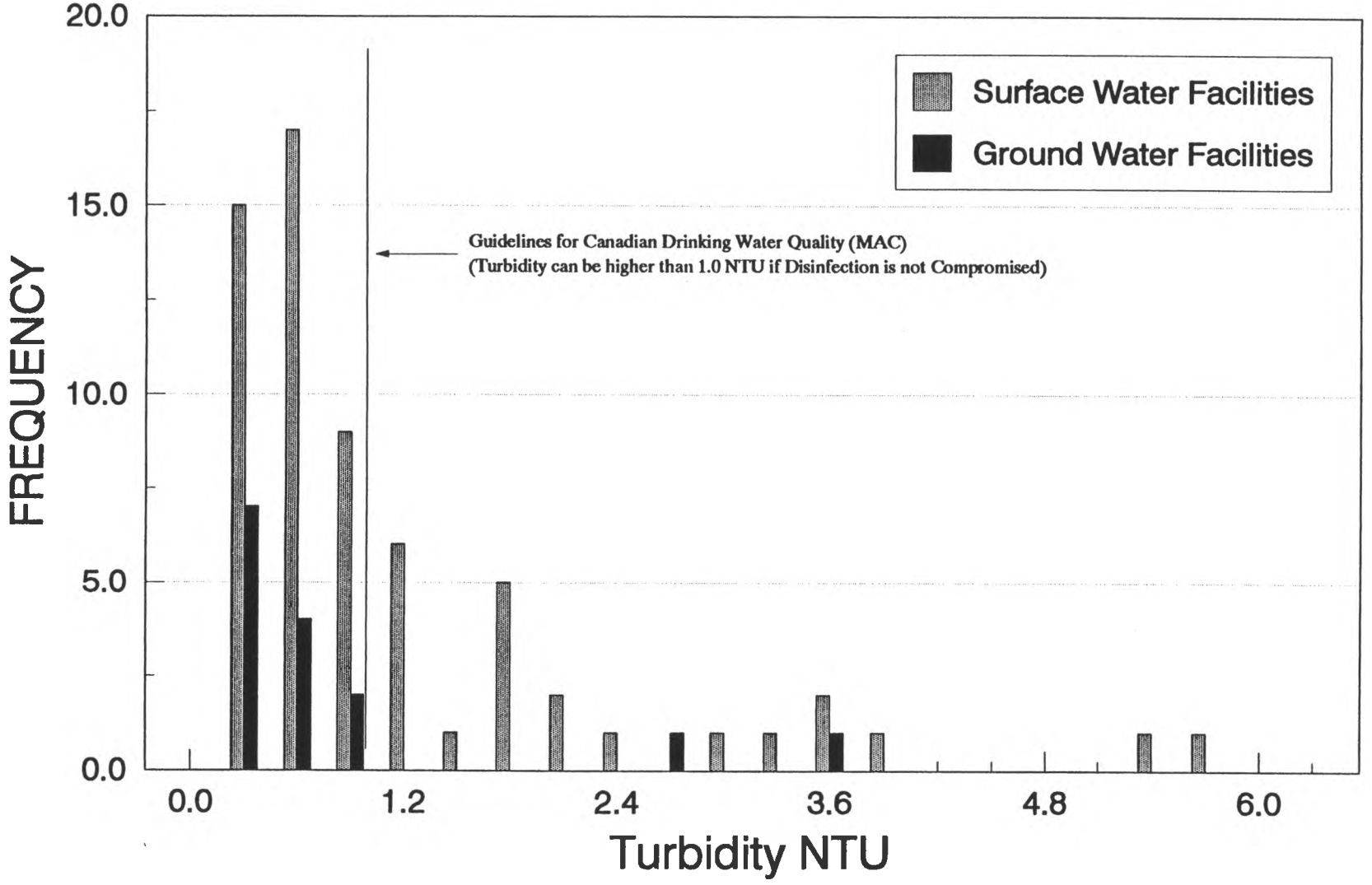
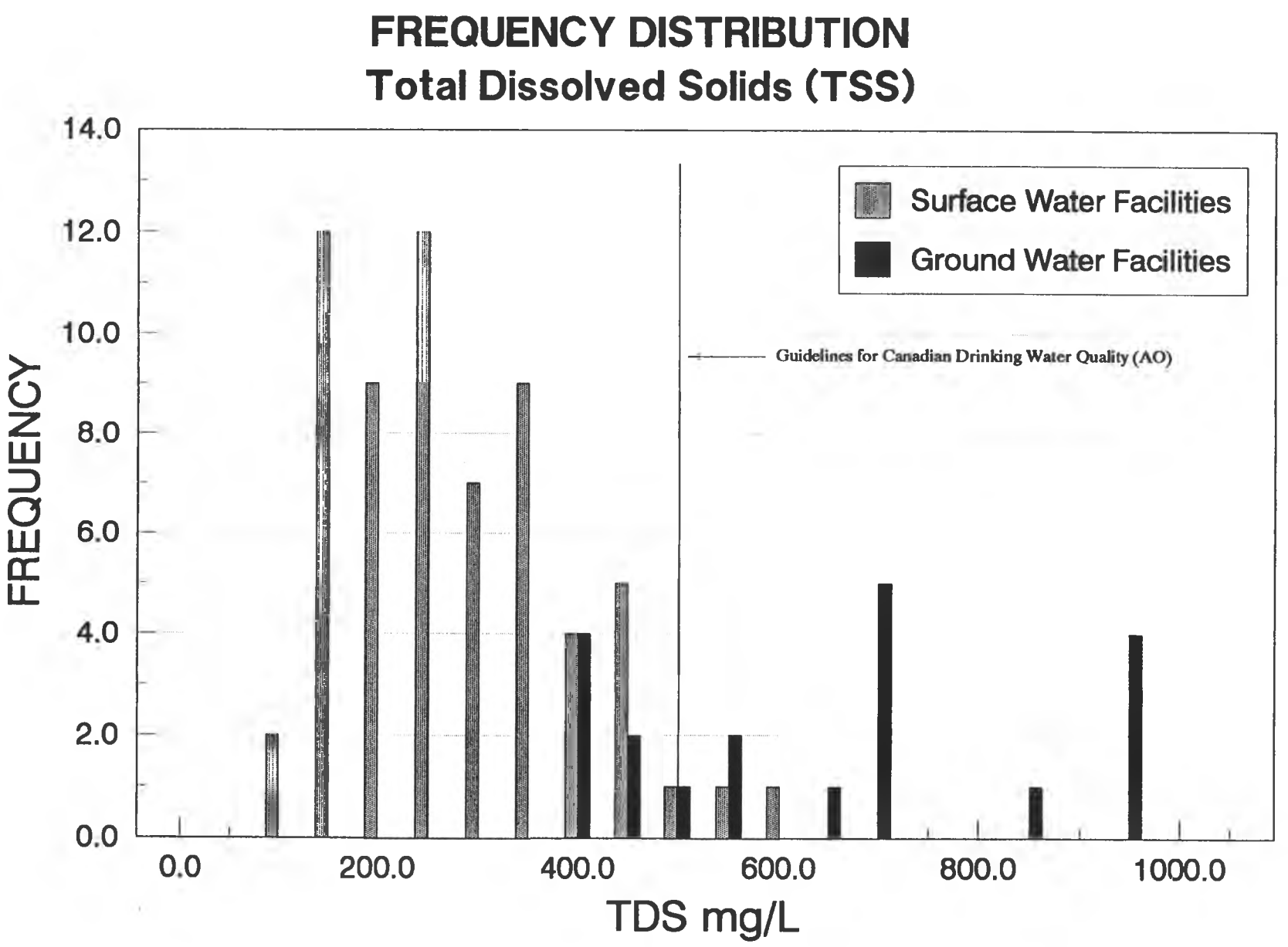
Hardness



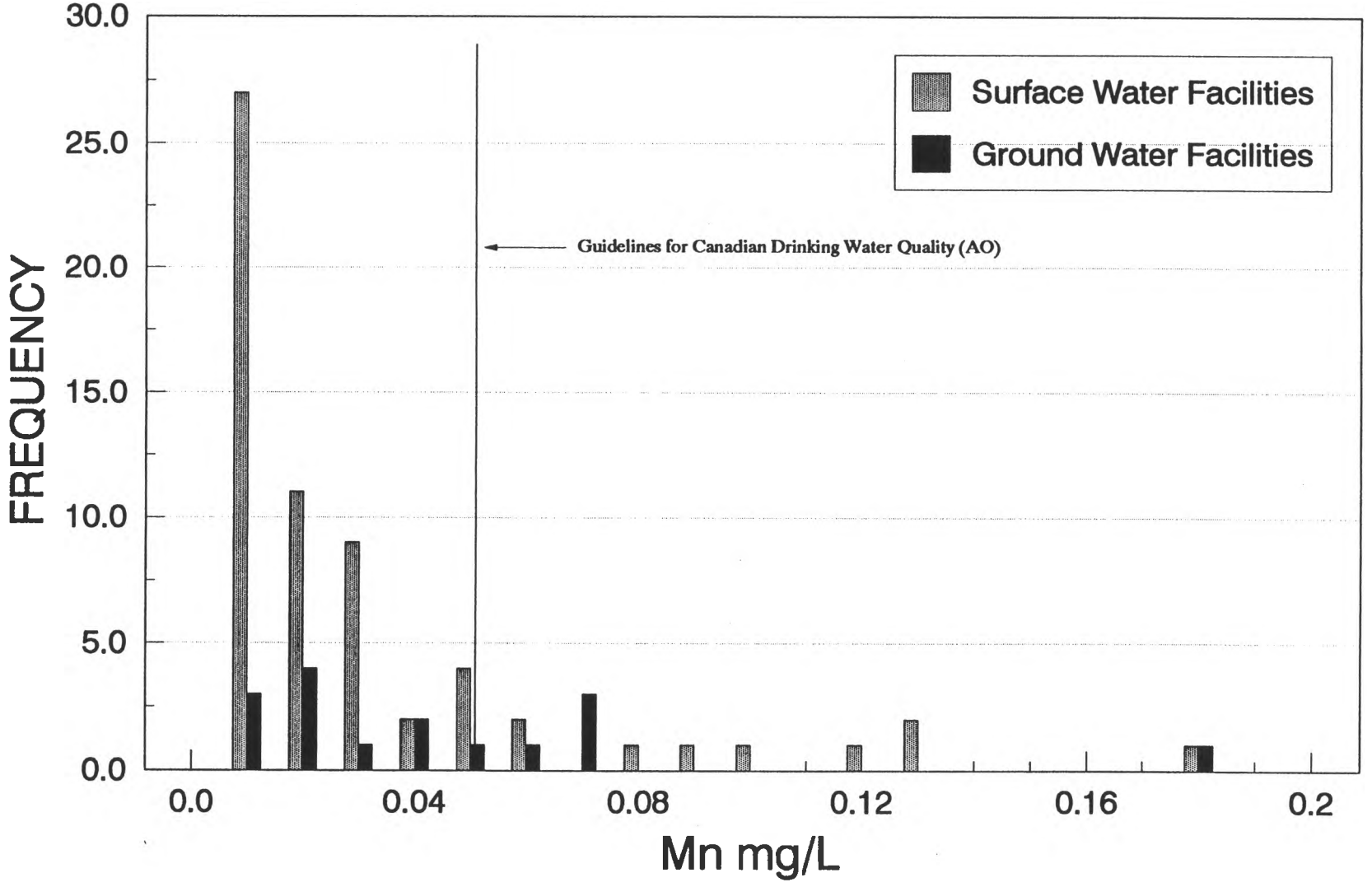
Sites

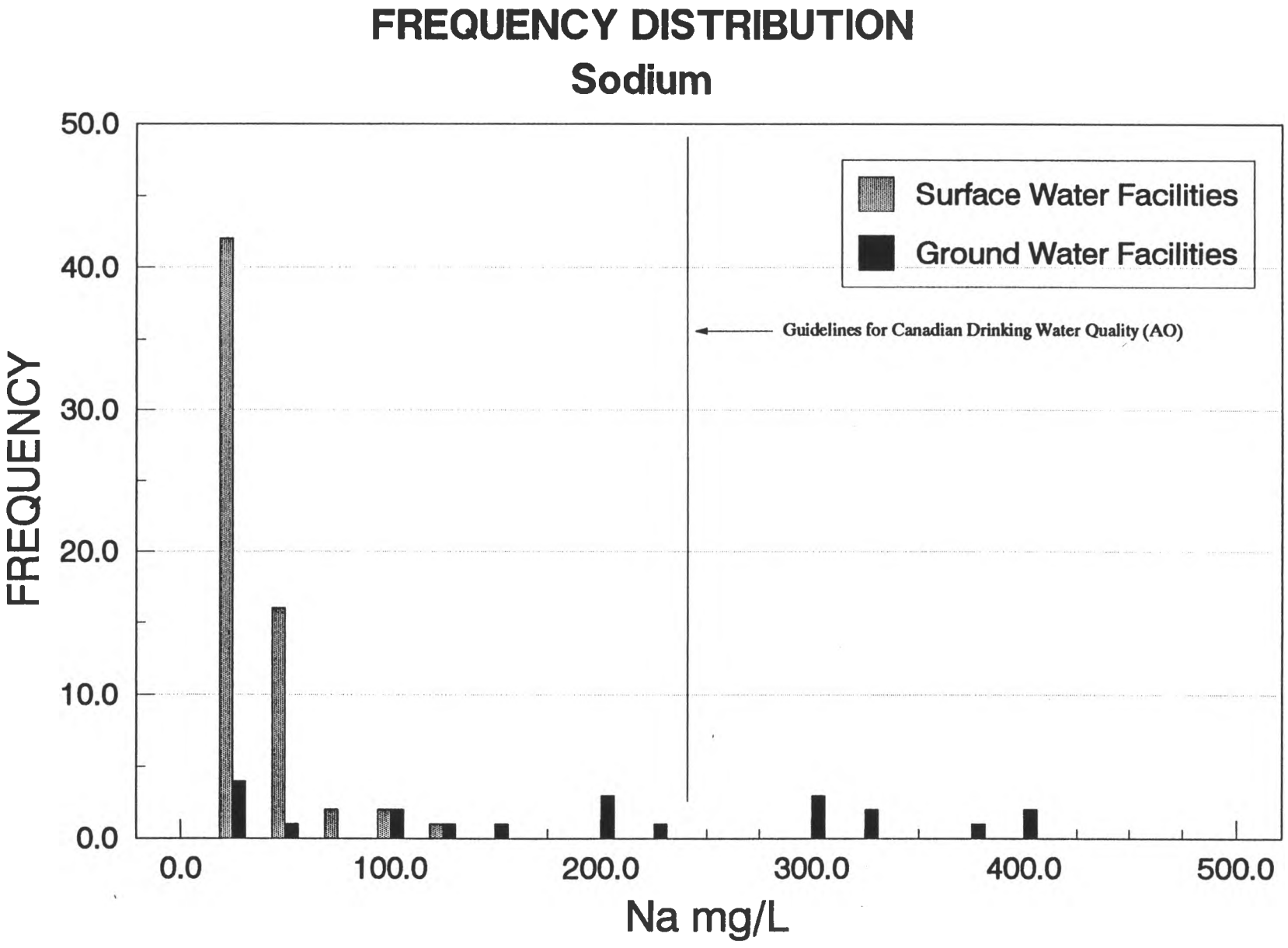
FREQUENCY DISTRIBUTION
Turbidity



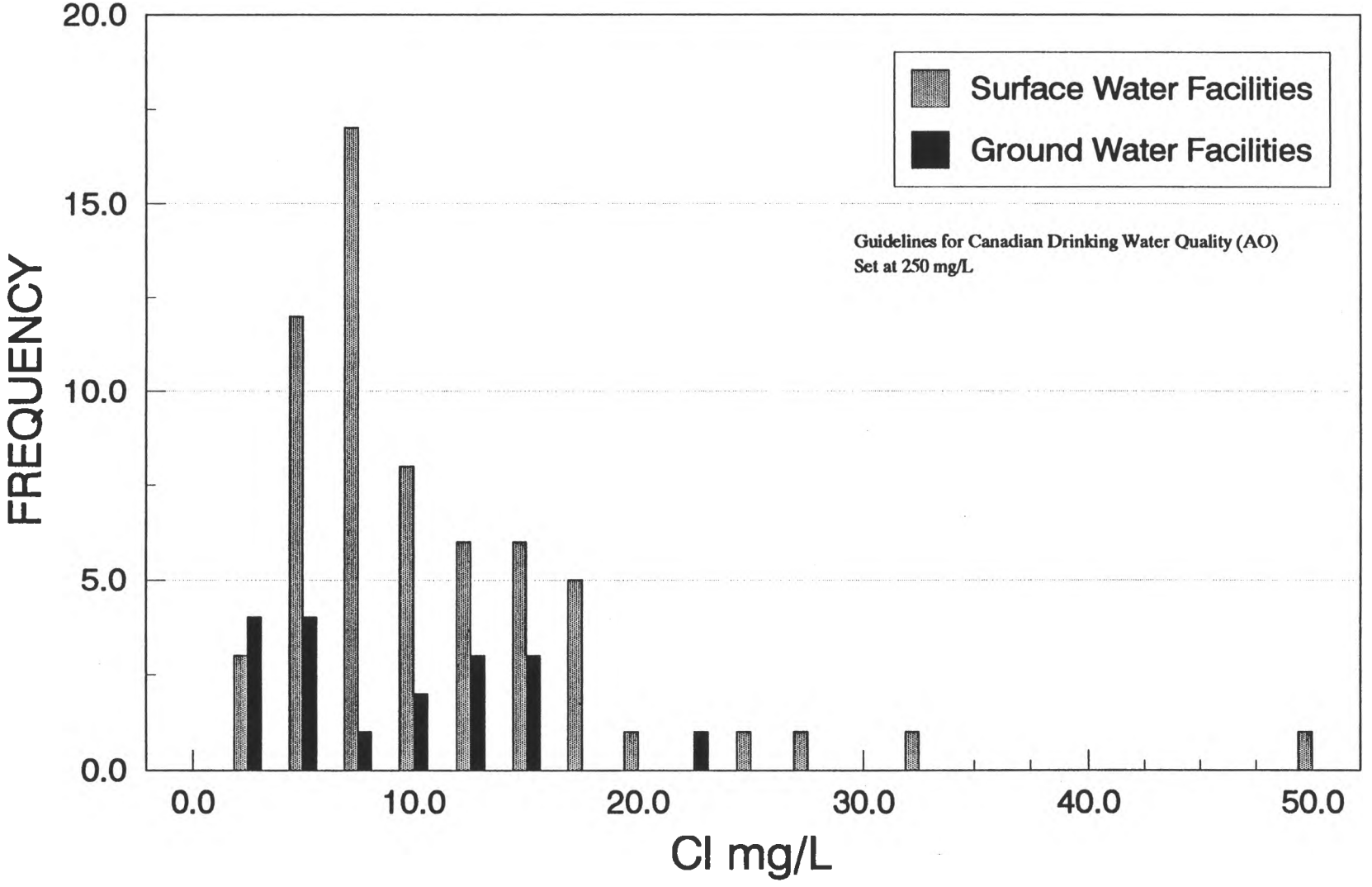

FREQUENCY DISTRIBUTION
Total Dissolved Solids (TSS)
FREQUENCY
14.0
12.0
10.0
8.0
6.0
4.0
2.0
0.0
0.0
200.0
400.0
600.0
800.0
1000.0
TDS mg/L
Surface Water Facilities
Ground Water Facilities
Guidelines for Canadian Drinking Water Quality (AO)

FREQUENCY DISTRIBUTION
Manganese




FREQUENCY DISTRIBUTION
Sodium
FREQUENCY
50.0
40.0
30.0
20.0
10.0
0.0
0.0
100.0
200.0
300.0
400.0
500.0
Na mg/L
Surface Water Facilities
Ground Water Facilities
Guidelines for Canadian Drinking Water Quality (AO)

FREQUENCY DISTRIBUTION
Chloride



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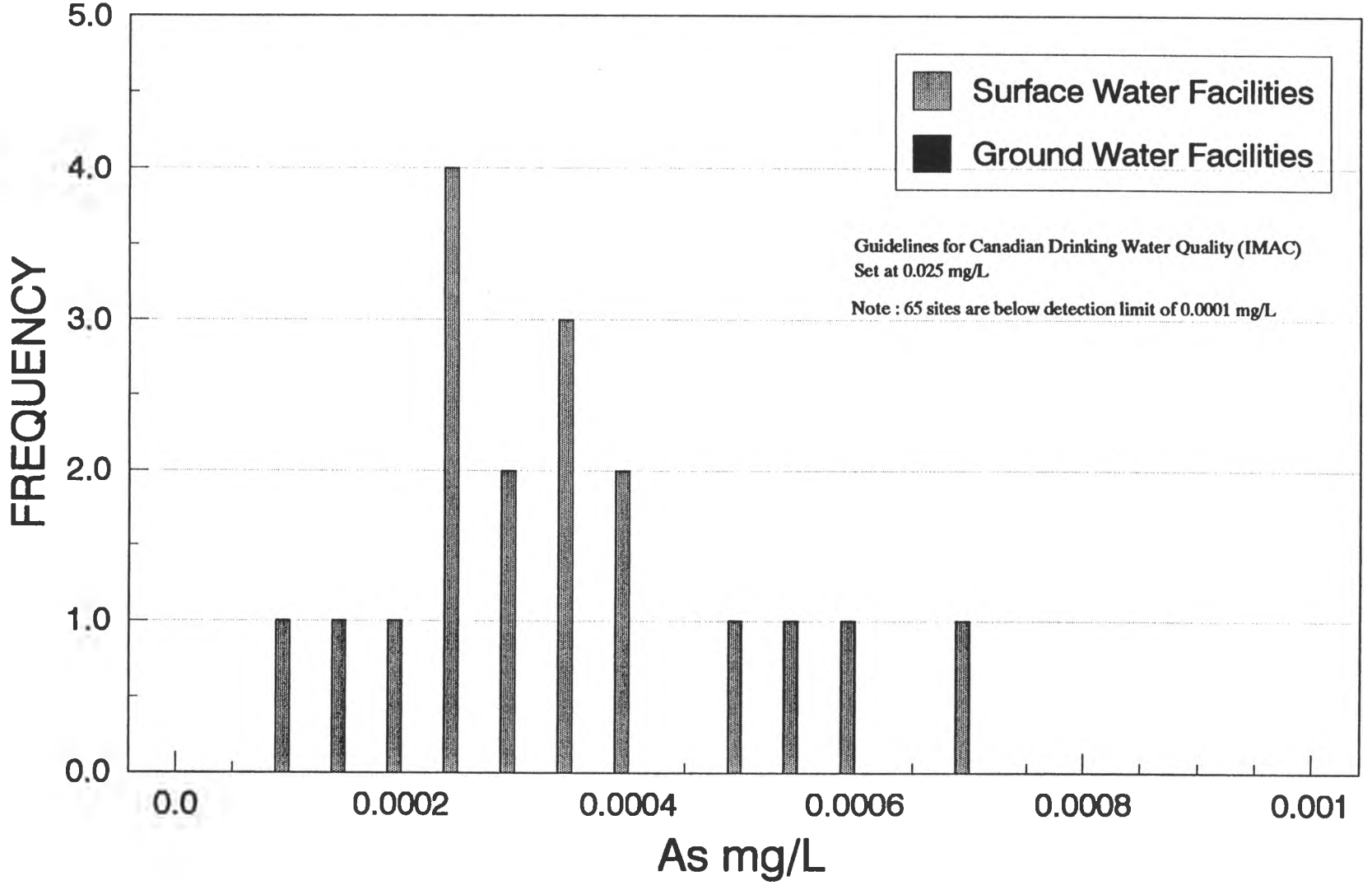
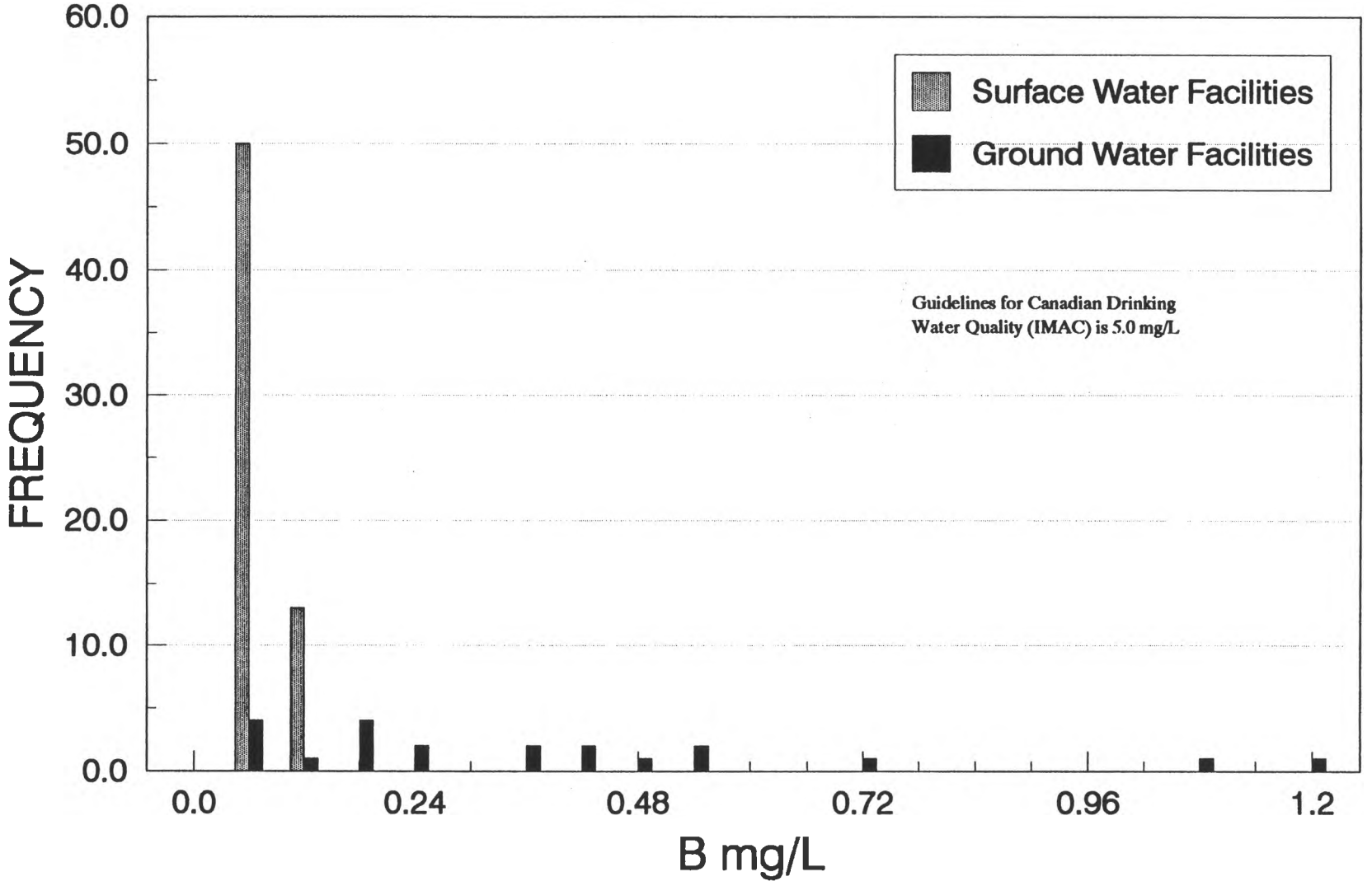
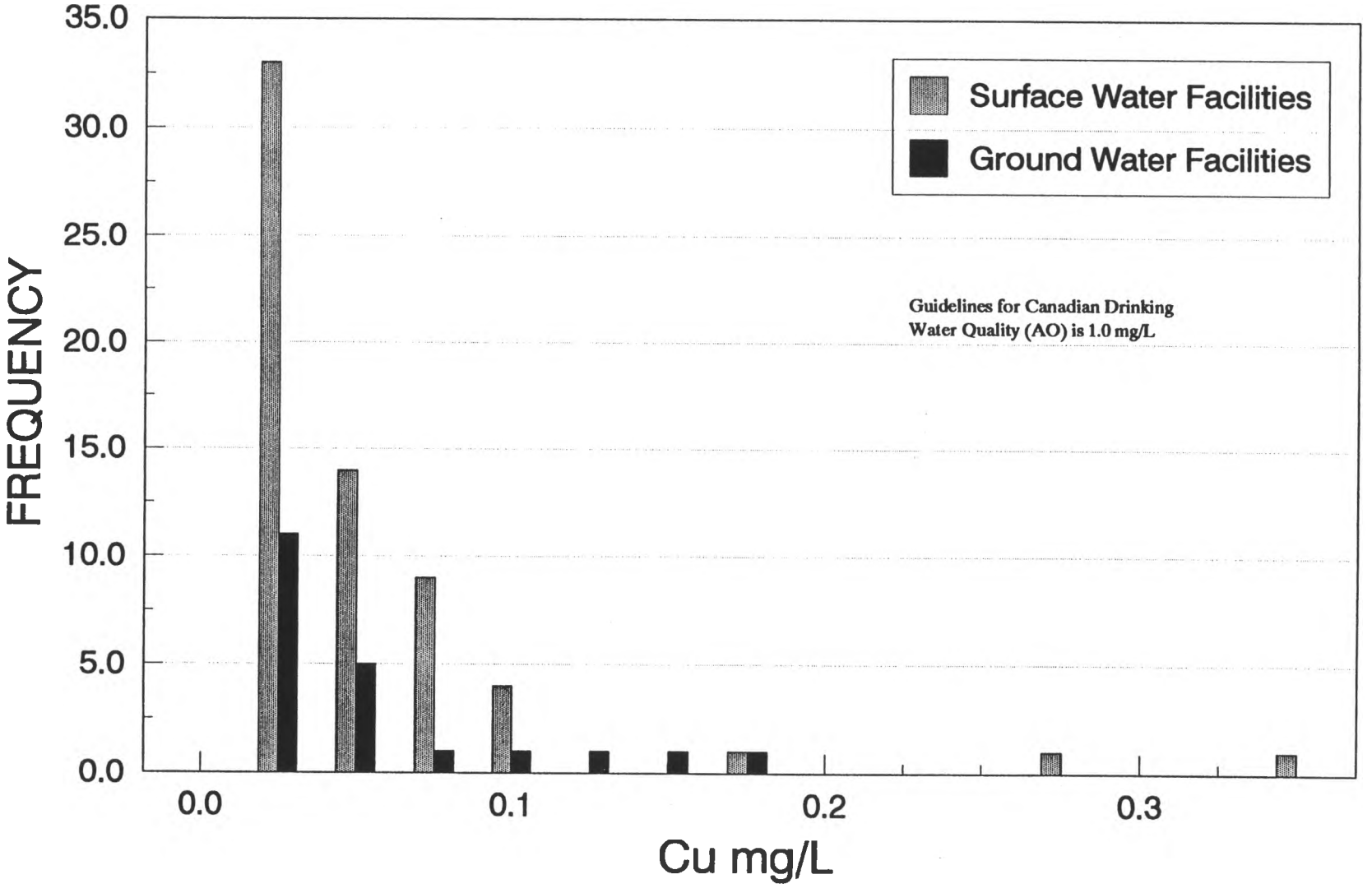
Arsenic



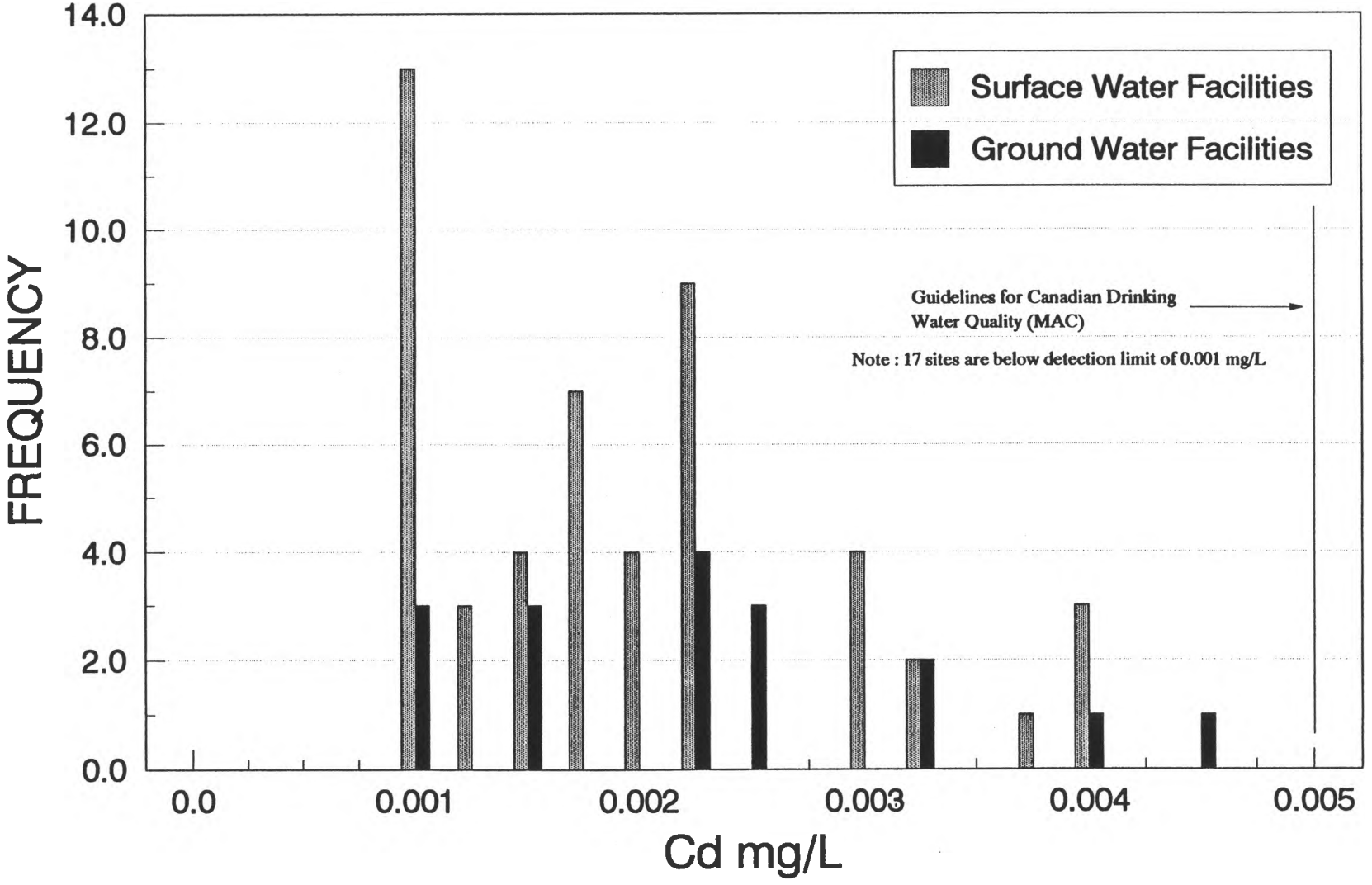
FREQUENCY DISTRIBUTION
Boron



FREQUENCY DISTRIBUTION
Copper

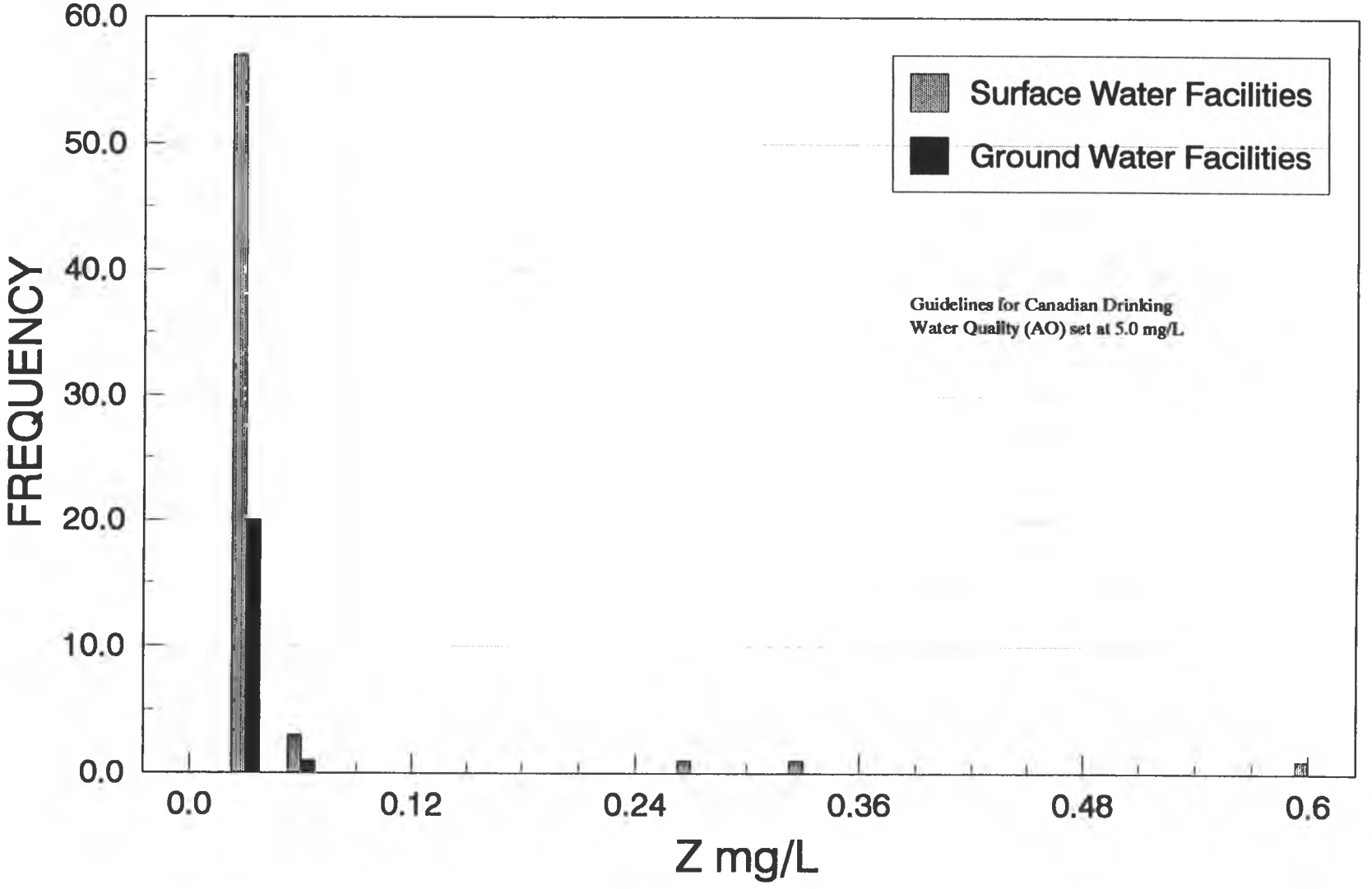


FREQUENCY DISTRIBUTION
Cadmium



FREQUENCY DISTRIBUTION

Zinc



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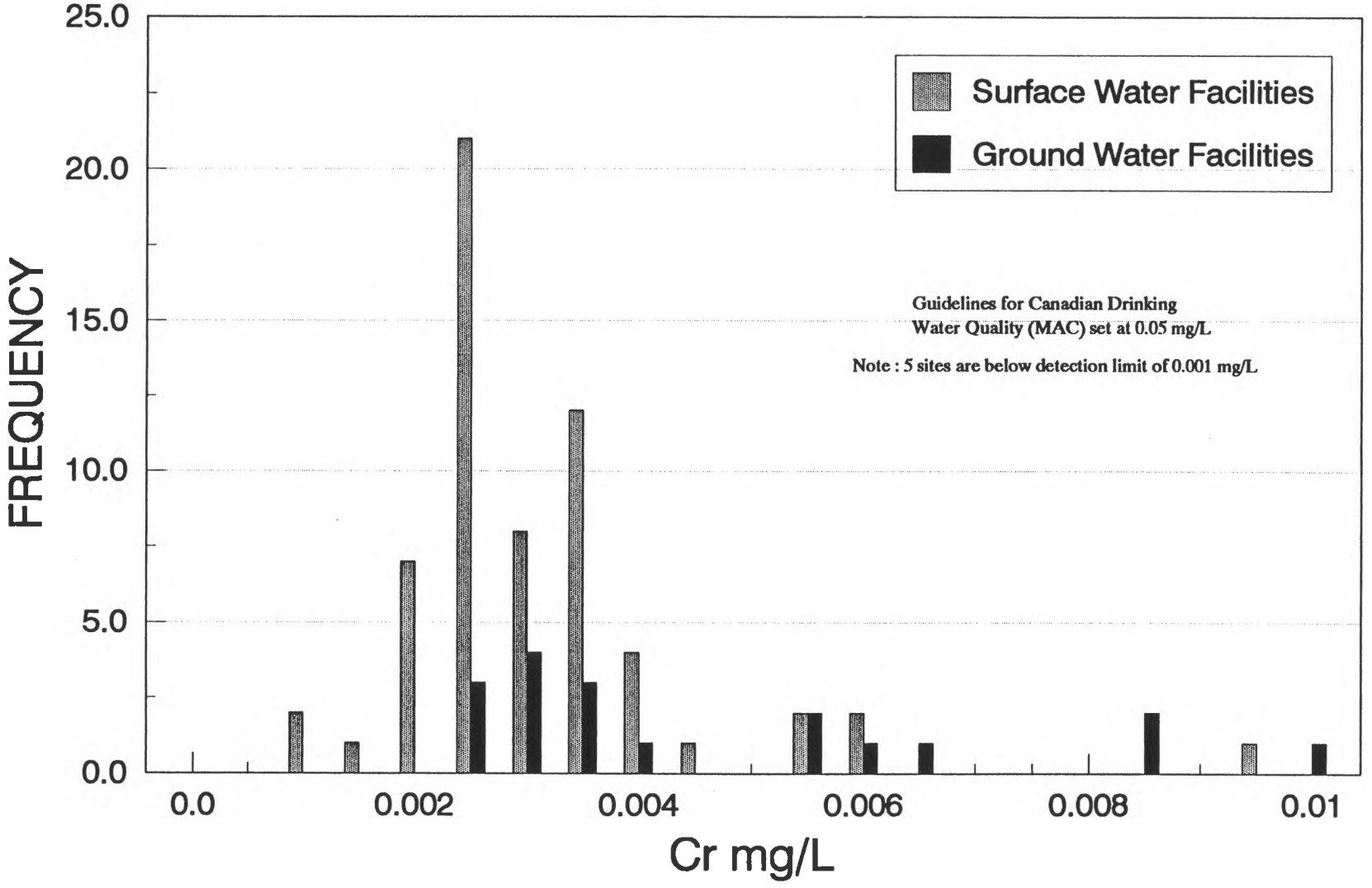
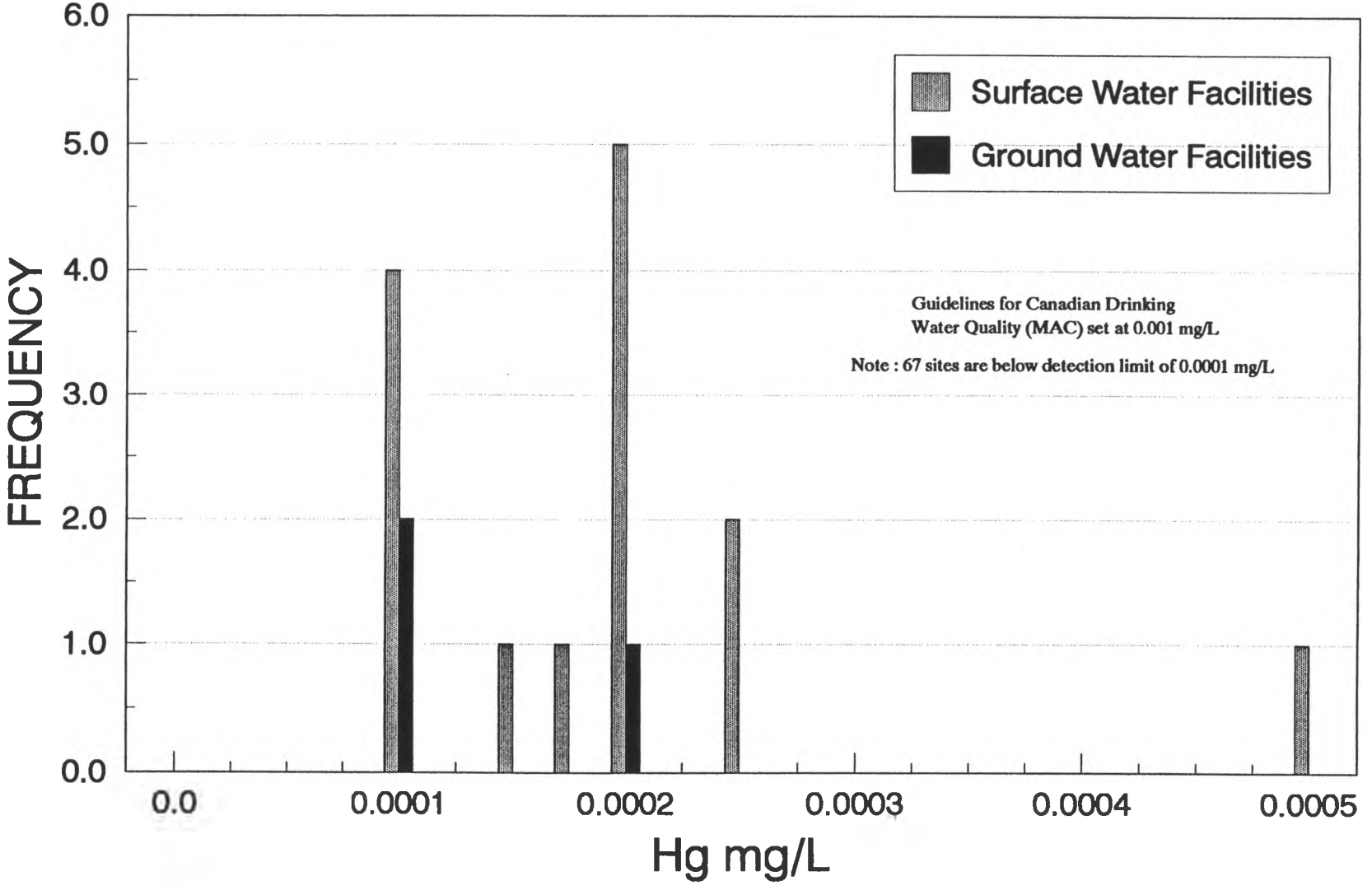
Chromium



FREQUENCY DISTRIBUTION
Mercury



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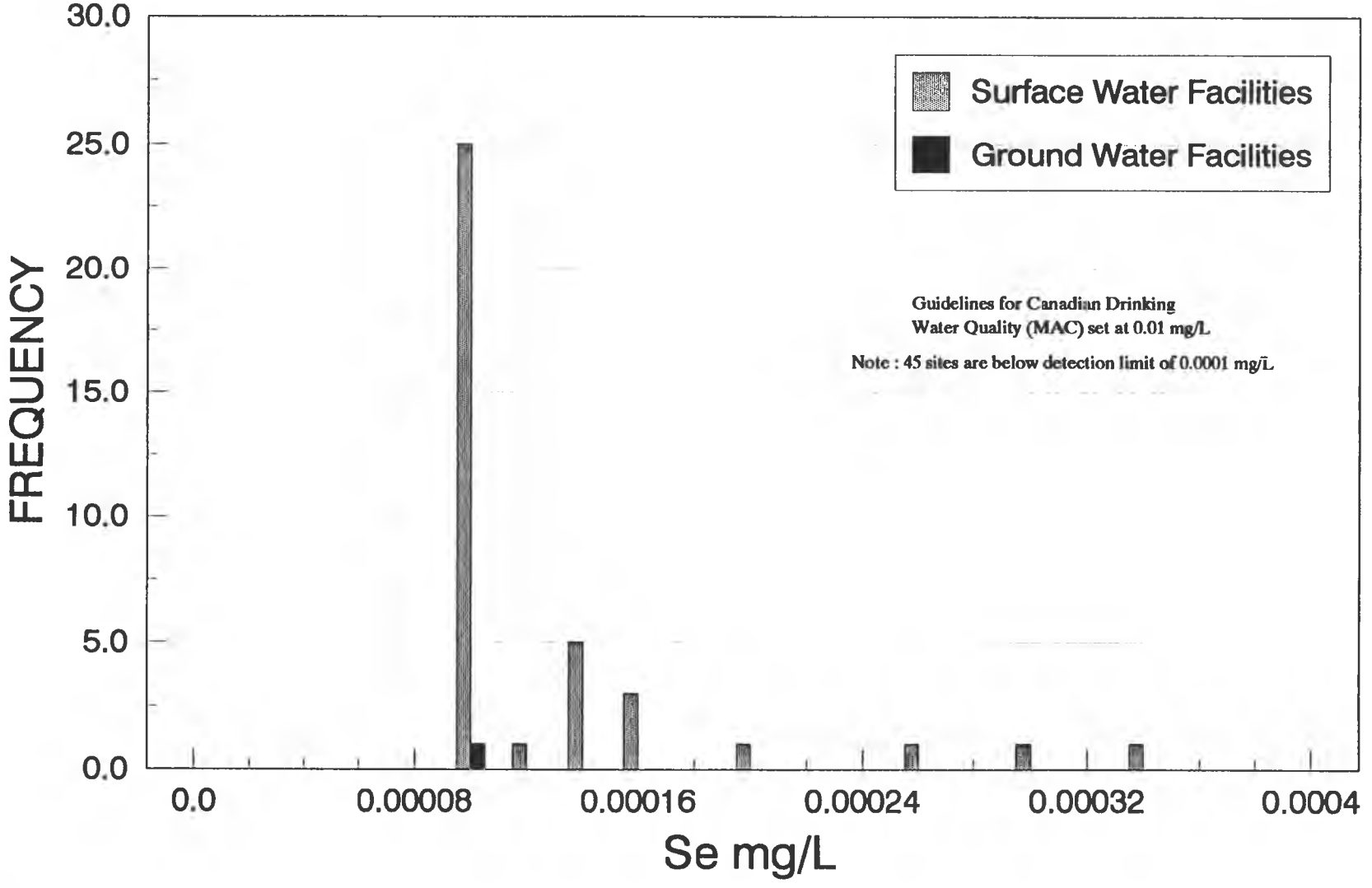
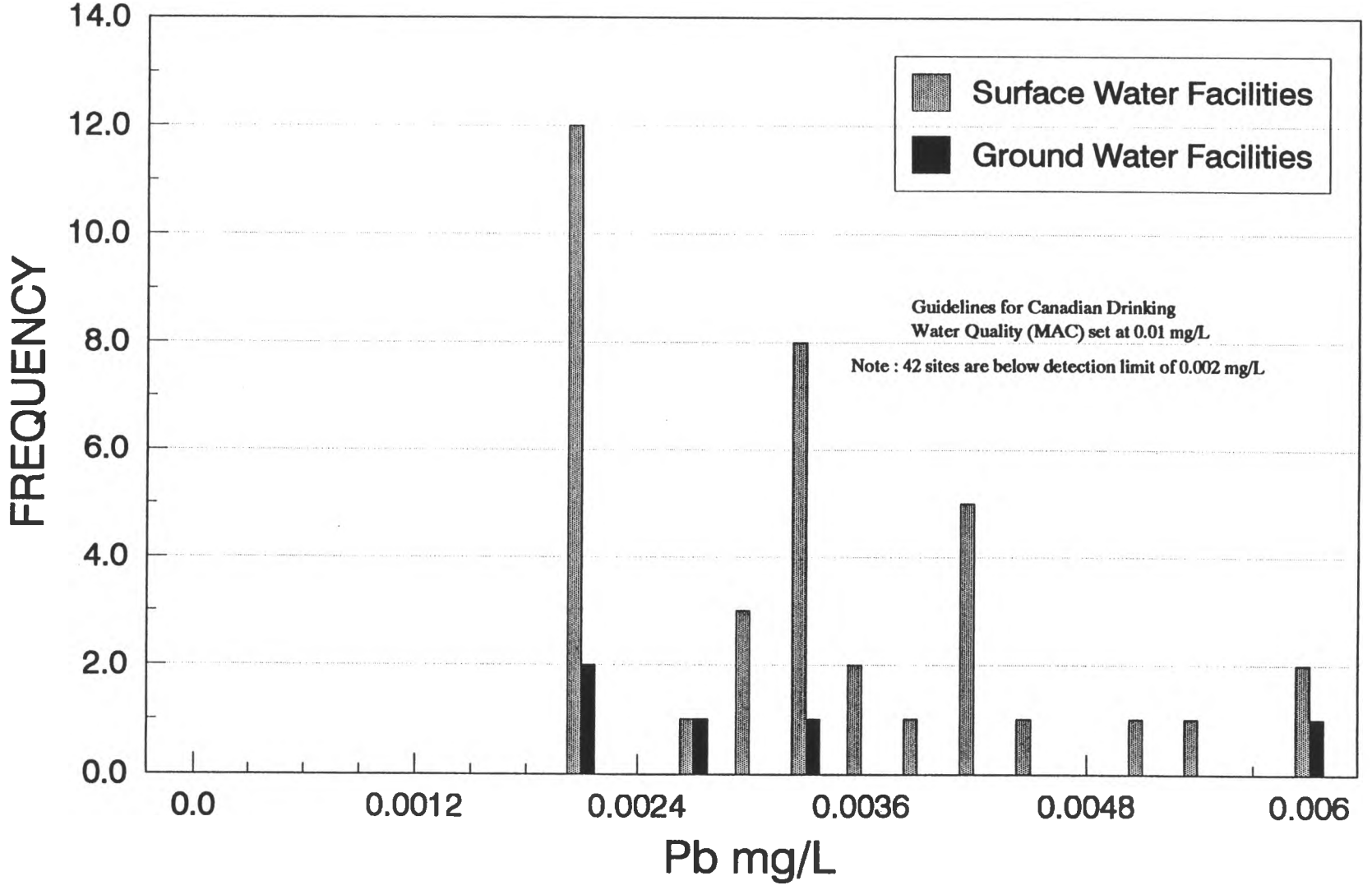
Selenium

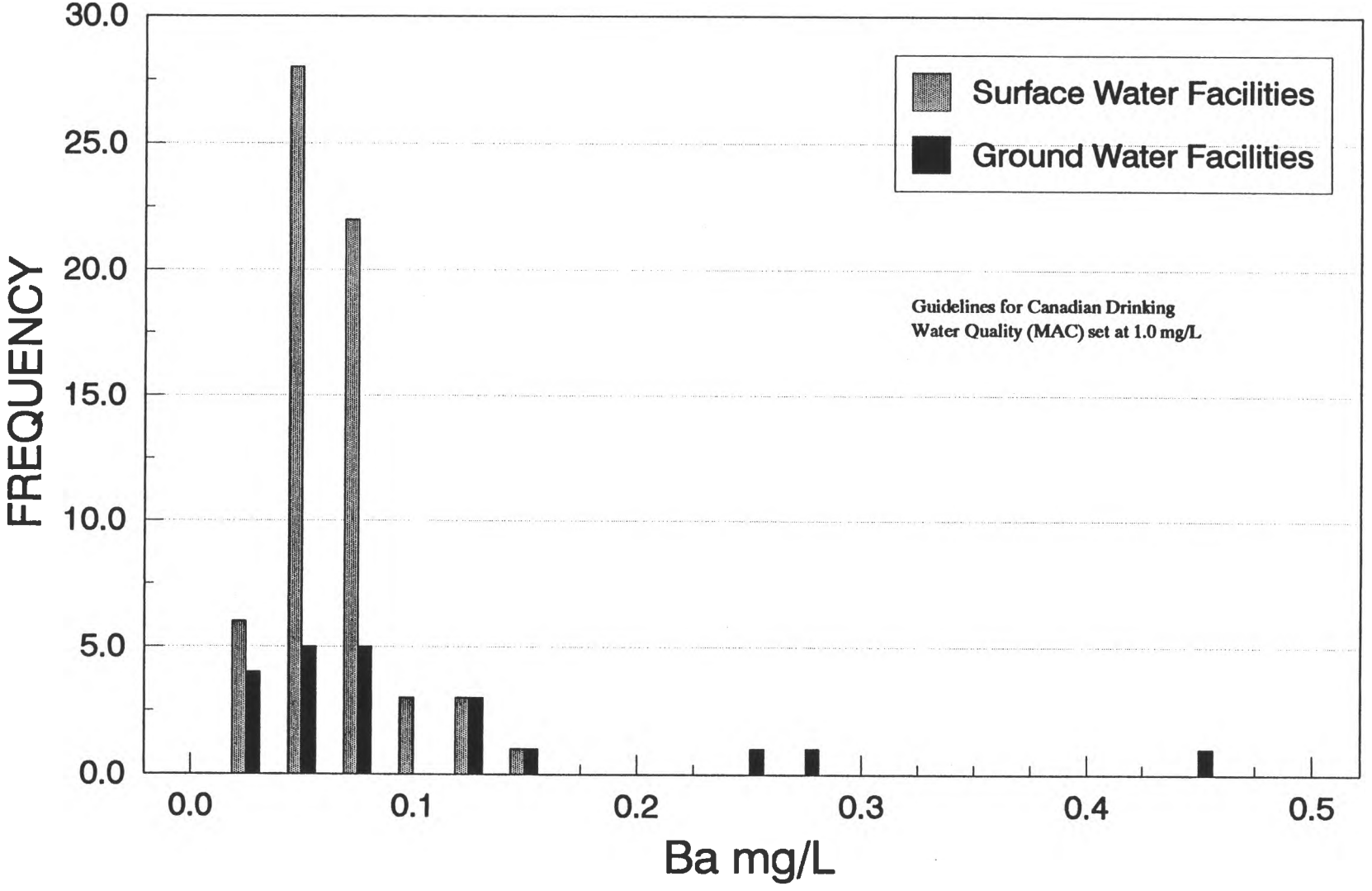


FREQUENCY DISTRIBUTION
Lead

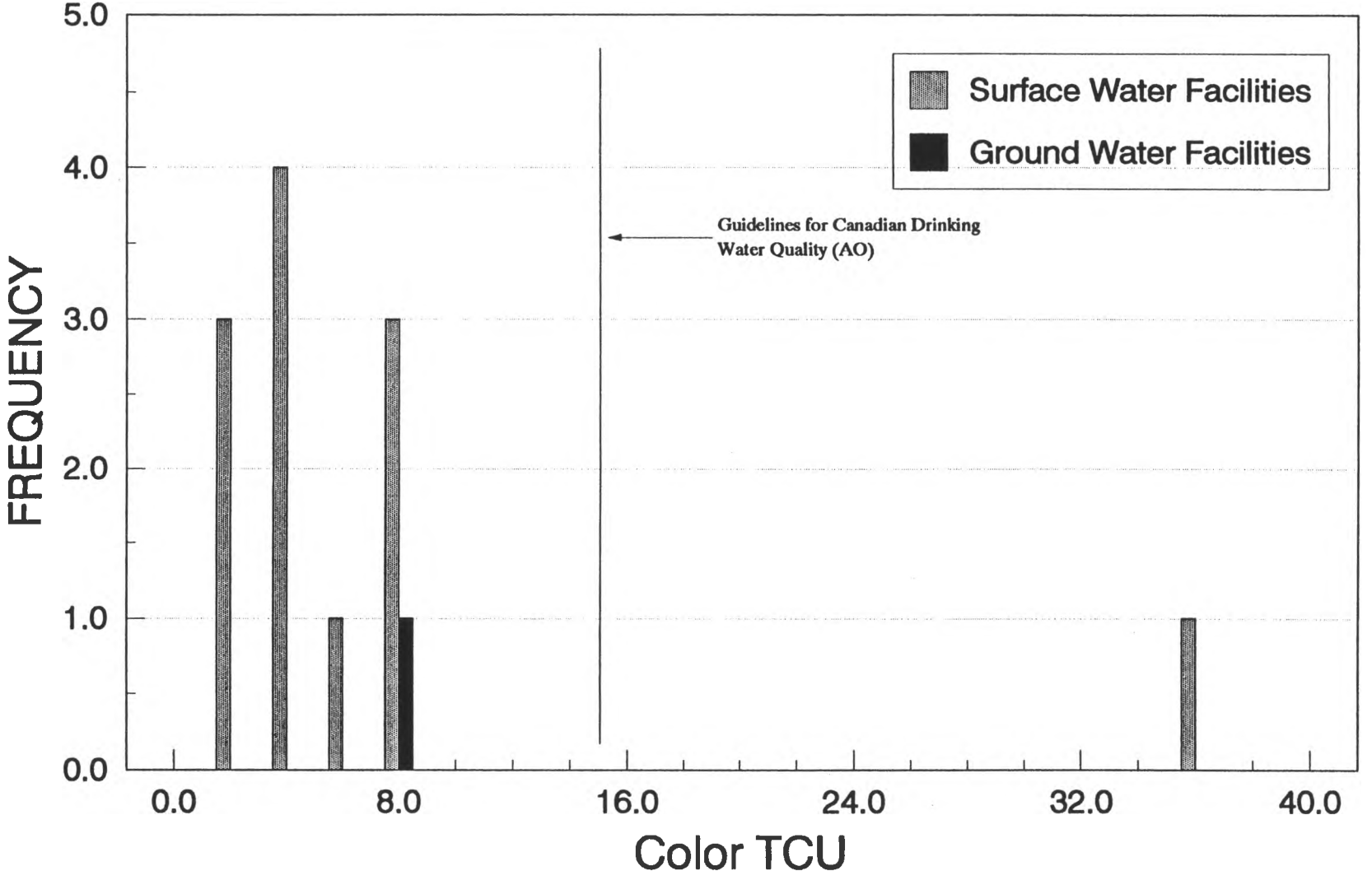


FREQUENCY DISTRIBUTION

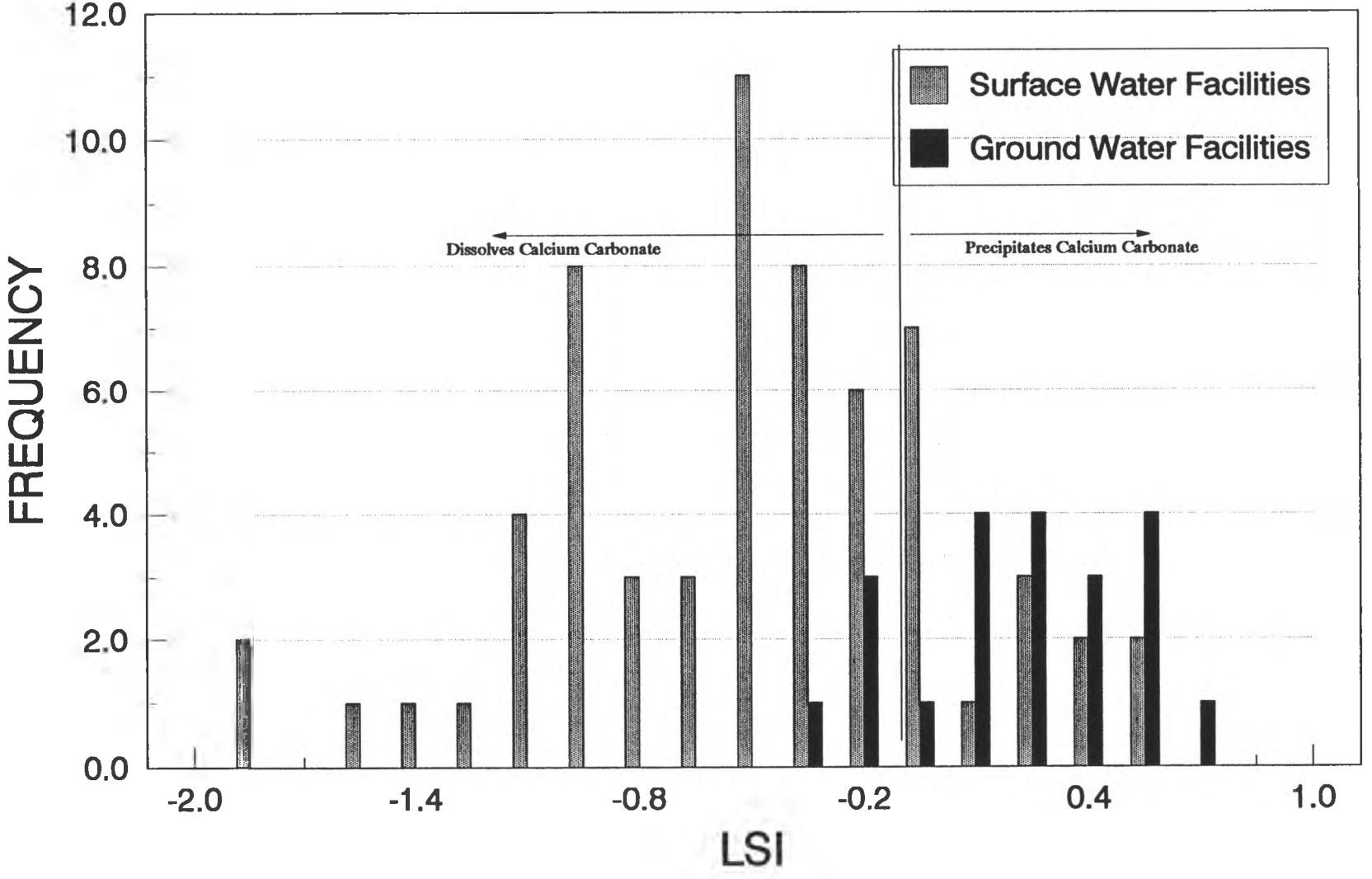
Barium



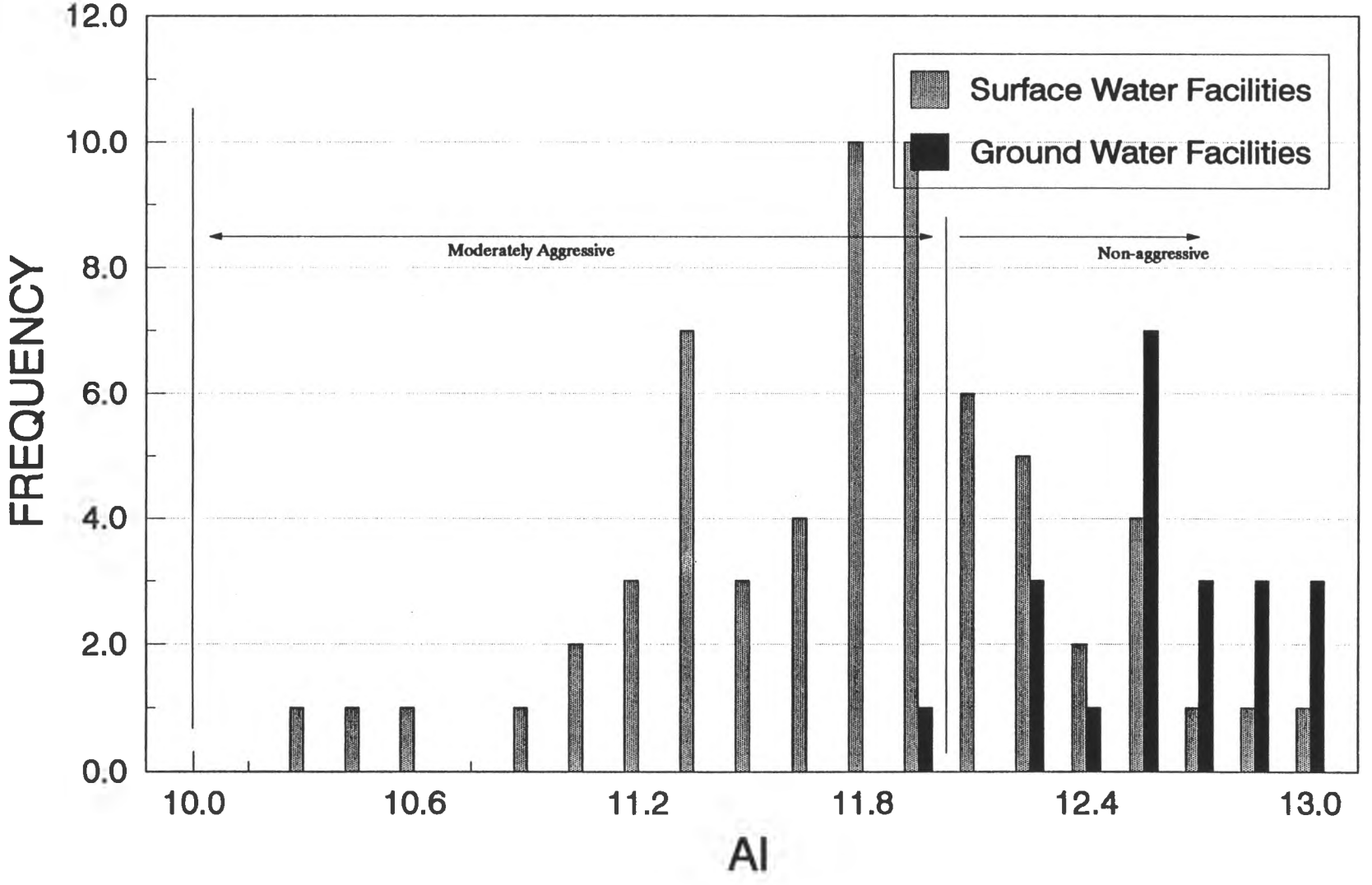
FREQUENCY DISTRIBUTION
Total Color



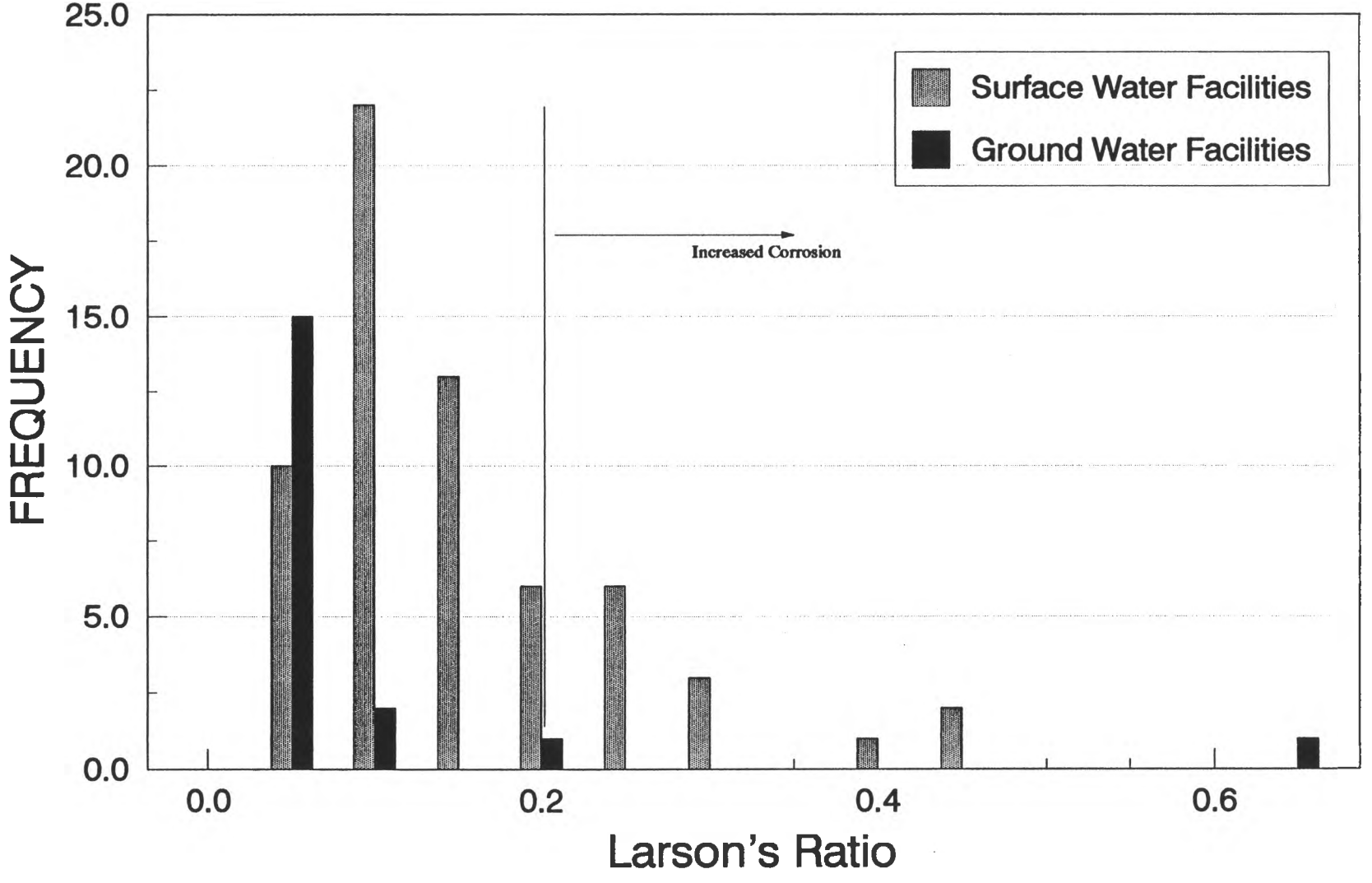
FREQUENCY DISTRIBUTION
Langelier Saturation Index (LSI)



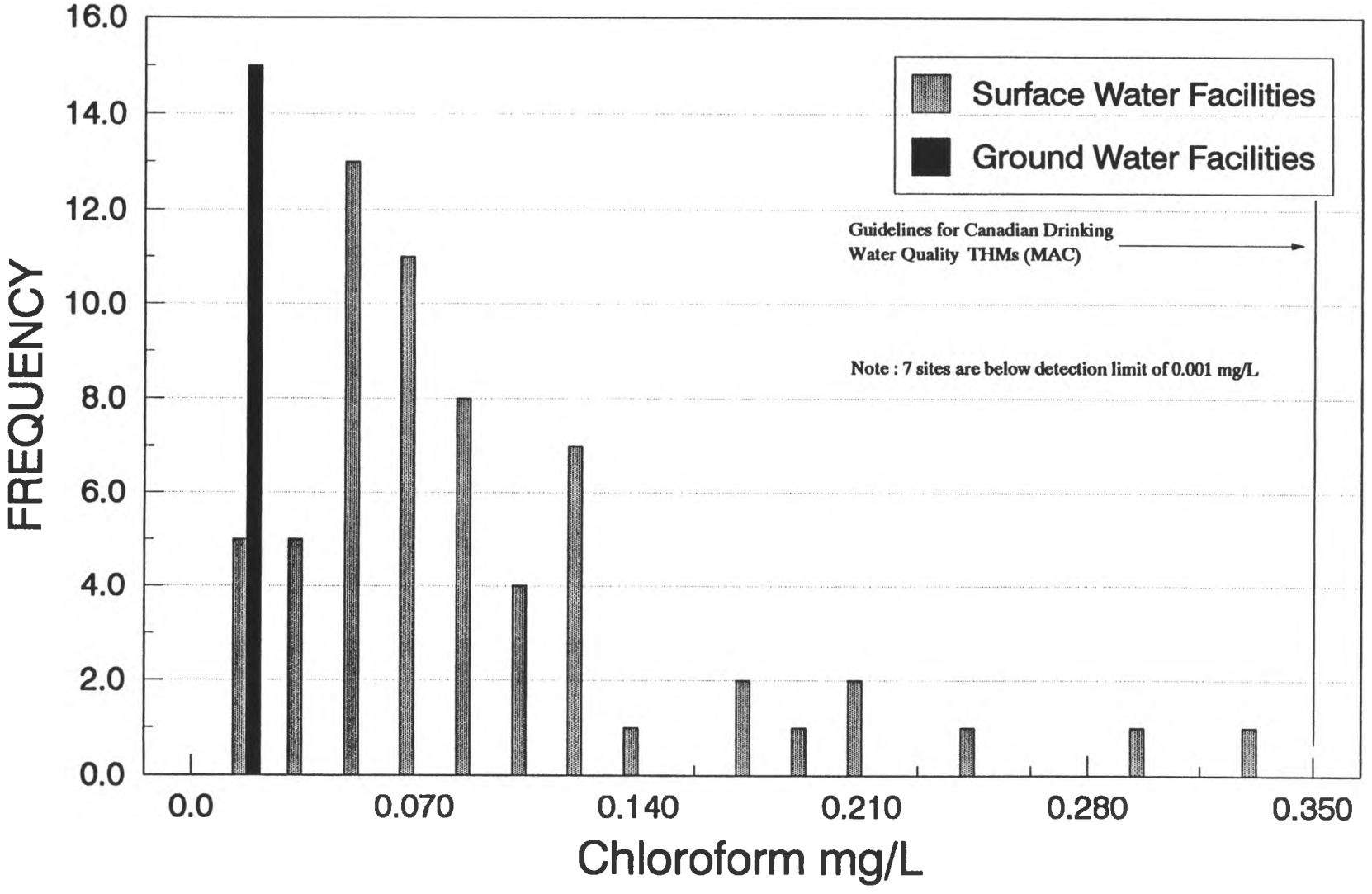
FREQUENCY DISTRIBUTION
Aggressive Index (AI)



FREQUENCY DISTRIBUTION
Larson's Ratio



FREQUENCY DISTRIBUTION
Chloroform



APPENDIX D: SUMMARY OF SAMPLES NOT MEETING GUIDELINES

SAMPLE LOCATION	WATER SOURCE	DATE SAMPLED	PARAMETERS OUTSIDE GCDWQ GUIDELINES			
BARRHEAD	Surface	01/17/90	TDS= 512			
BARRHEAD	Surface	04/10/91	TDS= 509			
BARRHEAD	Surface	03/12/93	TURB= 1.0	TDS= 509	MN= 0.125	
BLUE RIDGE	Ground	06/11/91	PH= 8.74	TDS= 670	NA= 283	
BLUESKY	Surface	09/09/91	PH= 8.58	FE= 0.516	TURB= 8.6	MN= 0.086
BLUESKY	Surface	02/19/92	FE= 0.509	TURB= 2.1	MN= 0.097	
BLUESKY	Surface	08/18/92	FE= 0.365	TURB= 5.4	MN= 0.052	Chloroform= 0.51
BOYLE	Surface	08/14/90	PH= 9.00	TURB= 1.7		
CLAIRMONT	Ground	06/08/87	PH= 8.80	F= 1.8	TDS= 902	NA= 375
CLAIRMONT	Ground	05/25/88	PH= 8.60	F= 1.9	TDS= 932	NA= 400
COLINTON	Ground	01/16/91	TDS= 926	MN= 0.053	NA= 310	
COLINTON	Ground	05/27/92	TDS= 914	NA= 301		
CYNTHIA	Ground	10/15/92	PH= 8.74	TDS= 682	NA= 282	
DEBOLT	Ground	03/17/87	PH= 8.70	TDS= 658	NA= 270	
DEBOLT	Ground	11/09/88	PH= 8.65	TDS= 666	NA= 285	
DESMARAIS	Surface	07/21/92	MN= 0.071			
EAGLESHAM	Surface	12/08/89	MN= 0.107			
EDSON	Ground	05/22/90	TDS= 532	NA= 201		
EDSON	Ground	10/23/90	MN= 0.197			
EDSON	Ground	04/23/87	TDS= 532			
EDSON	Ground	08/03/87	TDS= 539	NA= 204		
EDSON	Ground	08/17/88	TDS= 550	MN= 0.092		
EDSON	Ground	10/24/89	TDS= 532			
ENTWISTLE	Ground	05/07/91	MN= 0.698			
EVANSBURG	Ground	05/07/91	TDS= 513			
EVANSBURG	Ground	02/03/93	TDS= 514			
FAIRVIEW	Surface	07/17/90	MN= 0.086			
FALHER	Surface	09/12/89	TURB= 3.1			
FALHER	Surface	12/08/89	TDS= 502			
FAUST	Surface	06/18/90	TURB= 1.4			
FAUST	Surface	11/20/90	TURB= 1.3			
FAUST	Surface	05/27/92	TURB= 1.7			
FAUST	Surface	12/07/92	TURB= 1.6			
FAUST	Surface	01/05/93	TURB= 2.6			
FAWCETT	Ground	09/09/92	TDS= 644	NA= 212		

SAMPLE LOCATION	WATER SOURCE	DATE SAMPLED	PARAMETERS OUTSIDE GCDWQ GUIDELINES	
FORT CHIPEWYAN	Surface	06/16/93	2,4,Dichlorobenzene = 0.002	
FORT MCMURRAY	Surface	02/14/90	TURB= 1.3	
FORT MCMURRAY	Surface	02/02/93	TURB= 1.2	
FORT MCMURRAY	Surface	04/23/87	FE= 1.400	TURB= 19.4
FORT MCMURRAY	Surface	07/19/88	TURB= 1.8	
FORT MCMURRAY	Surface	10/19/88	FE= 0.494	TURB= 7.9
FORT MCMURRAY	Surface	08/22/89	FE= 0.362	
FORT VERMILION	Surface	10/24/91	FE= 0.458	TURB= 12.5
FORT VERMILION	Surface	01/22/92	TURB= 1.9	
FOX CREEK	Ground	06/13/90	FE= 0.325	MN= 0.070
FOX CREEK	Ground	10/14/92	TDS= 508	MN= 0.064
FOX CREEK	Ground	01/17/89	MN= 0.073	
GIFT LAKE	Ground	04/24/90	MN= 0.079	
GIFT LAKE	Ground	08/12/91	MN= 0.056	
GIROUXVILLE	Surface	12/05/90	TURB= 1.9	
GRANDE CACHE	Surface	10/13/87	TURB= 1.1	
GRANDE CACHE	Surface	03/13/89	TURB= 1.3	
GRANDE PRAIRIE	Surface	08/13/90	TURB= 1.5	
GRANDE PRAIRIE	Surface	05/01/89	TURB= 1.3	
GRASSLAND	Surface	08/13/90	TURB= 4.0	MN= 0.236
GRASSLAND	Surface	09/09/91	TURB= 2.0	Chloroform=0.37
GROUARD	Surface	09/11/90	TURB= 4.2	
GROUARD	Surface	02/13/91	TURB= 3.2	MN= 0.609
GROUARD	Surface	11/16/92	TURB= 1.3	
GUY	Surface	12/05/91	TURB= 4.4	MN= 0.083
GUY	Surface	04/29/92	TURB= 2.9	MN= 0.080
HIGH LEVEL	Surface	10/22/91	TDS= 580	
HIGH LEVEL	Surface	05/10/89	TDS= 585	MN= 0.162
HIGH LEVEL	Surface	10/25/89	TURB= 1.2	TDS= 633
HIGH PRAIRIE	Surface	04/23/90	TURB= 1.1	
HIGH PRAIRIE	Surface	02/13/91	TURB= 1.1	
HIGH PRAIRIE	Surface	06/09/87	TURB= 1.2	
HINES CREEK	Surface	02/13/90	TURB= 1.8	
HINES CREEK	Surface	07/17/90	TURB= 1.8	
HINES CREEK	Surface	05/19/93	TURB= 1.9	
HINTON	Surface	10/23/90	TURB= 3.9	2,4,Dichlorobenzene = 0.003
HINTON	Surface	12/01/88	TURB= 1.3	
HINTON	Surface	12/07/89	PH= 8.95	
HINTON	Surface	05/22/90	2,4,Dichlorobenzene = 0.003	

SAMPLE LOCATION	WATER SOURCE	DATE SAMPLED	PARAMETERS OUTSIDE GCDWQ GUIDELINES			
HINTON	Surface	08/12/91	2,4,Dichlorobenzene = 0.005			
HINTON	Surface	03/16/88	2,4,Dichlorobenzene = 0.002			
HINTON	Surface	10/24/89	2,4,Dichlorobenzene = 0.002			
JANVIER	Surface	09/11/91	MN= 0.071			
JARVIE	Ground	09/09/92	TDS= 651	MN= 0.171		
	Ground					
JEAN COTE	Surface	07/16/91	TURB= 5.3			
JEAN COTE	Surface	12/05/91	TURB= 3.9	MN= 0.066		
JEAN COTE	Surface	04/29/92	TURB= 2.5			
LA CRETE	Ground	10/24/91	MN= 0.283			
LA CRETE	Ground	02/04/93	MN= 0.157			
LAC LA BICHE	Surface	08/14/90	TURB= 2.1	MN= 0.104	0.104	
LAC LA BICHE	Surface	10/24/91	PH= 8.60			
LAC LA BICHE	Surface	02/20/92	PH= 8.72			
LAC LA BICHE	Surface	10/13/88	TURB= 1.2			
LAC LA BICHE	Surface	08/16/89	MN= 0.086			
LOON LAKE	Surface	08/12/91	TURB= 4.2	MN= 0.107		
LOON LAKE	Surface	05/25/92	TURB= 2.4			
MANNING	Surface	10/22/90	TURB= 2.8			
MARIE REINE	Ground	04/11/91	TURB= 3.0	MN= 0.129	0.129	
MAYERTHORPE	Ground	06/13/90	TDS= 846	NA= 305		
MAYERTHORPE	Ground	02/25/92	TDS= 839	NA= 310		
MCLENNAN	Surface	06/23/92	TURB= 3.0	MN= 0.126		
MCLENNAN	Surface	01/18/89	TURB= 4.4	MN= 0.105		
NAMPA	Surface	04/10/91	TURB= 1.4			
NEERLANDIA	Surface	07/20/90	FE= 0.426	TURB= 1.1	MN= 0.054	
NEERLANDIA	Surface	04/10/91	T_COLOR=	36		
PADDLE PRAIRIE	Ground	10/22/91	TURB= 5.2	MN= 0.146		
PADDLE PRAIRIE	Ground	01/21/92	MN= 0.331			
PEACE RIVER	Surface	08/15/90	MN= 0.053			
PEACE RIVER	Surface	06/21/88	TURB= 1.1	2,4,Dichlorobenzene = 0.003		
PEERLESS LAKE	Surface	08/13/91	FE= 0.328			
PEERLESS LAKE	Surface	05/26/92	FE= 0.491	TURB= 1.7		
PEERLESS LAKE	Surface	11/17/92	FE= 0.839	TURB= 4.0		
PEORIA	Surface	03/11/91	TDS= 575			
PIBROCH	Ground	09/09/92	PH= 8.61	TDS= 922	MN= 0.066	NA= 393

SAMPLE LOCATION	WATER SOURCE	DATE SAMPLED	PARAMETERS OUTSIDE GCDWQ GUIDELINES			
PLAMONDON	Surface	08/14/90	MN= 0.053			
RAINBOW LAKE	Surface	05/29/90	TURB= 1.8			
RAINBOW LAKE	Surface	10/23/91	TURB= 1.3			
RYCROFT	Surface	03/19/90	TURB= 2.6	MN= 0.097		
RYCROFT	Surface	01/16/91	MN= 0.201			
RYCROFT	Surface	02/19/92	TURB= 1.4	MN= 0.103		
RYCROFT	Surface	08/18/92	MN= 0.151			
RYCROFT	Surface	01/18/89	TURB= 2.3	MN= 0.072		
RYCROFT	Surface	04/11/89	TURB= 2.7	MN= 0.091		
SANDY LAKE	Surface	05/16/91	FE= 0.732	TURB= 5.1	MN= 0.292	
SANDY LAKE	Surface	07/21/92	FE= 0.527	TURB= 5.4	MN= 0.099	Chloroform= 0.44
SANGUDO	Ground	06/11/91	FE= 0.301	TDS= 896	NA= 356	
SANGUDO	Ground	06/24/92	TDS= 913	NA= 360		
SLAVE LAKE	Surface	12/08/92	TURB= 1.1			
SLAVE LAKE	Surface	04/12/88	TURB= 1.5	MN= 0.059		
SLAVE LAKE	Surface	06/19/89	TURB= 12.6			
SMITH	Surface	01/17/91	FE= 3.830	TURB= 33.0		
SPIRIT RIVER	Surface	06/18/91	MN= 0.107			
SPIRIT RIVER	Surface	02/13/89	MN= 0.090			
ST. ISIDORE	Surface	04/11/91	FE= 0.319	TURB= 5.6	MN= 0.125	
TANGENT	Surface	06/18/91	TURB= 1.4			
TROUT LAKE	Ground	08/13/91	TURB= 2.5			
VALLEYVIEW	Surface	12/07/92	MN= 0.063			
VALLEYVIEW	Surface	06/15/93	MN= 0.150			
VALLEYVIEW	Surface	06/29/87	FE= 0.690	TURB= 16.2		
VALLEYVIEW	Surface	11/09/87	TURB= 2.9			
VALLEYVIEW	Surface	07/20/88	MN= 0.057			
VALLEYVIEW	Surface	12/12/88	MN= 0.060			
VALLEYVIEW	Surface	06/20/89	MN= 0.553			
VALLEYVIEW	Surface	12/08/89	PB= 0.012			
WABASCA	Surface	03/16/93	TURB= 1.3			
WANDERING RIVER	Surface	09/09/91	TURB= 2.0			
WANDERING RIVER	Surface	06/14/93	2,4,Dichlorobenzene = 0.002			
WANHAM	Surface	06/24/92	MN= 0.051			
WANHAM	Surface	06/18/91	TURB= 1.9	MN= 0.166		
WANHAM	Surface	11/25/91	TURB= 2.0	MN= 0.082		
WHITECOURT	Surface	11/08/88	TURB= 1.6			

SAMPLE LOCATION	WATER SOURCE	DATE SAMPLED	PARAMETERS OUTSIDE GCDWQ GUIDELINES				
WILDWOOD	Ground	05/07/91	FE= 0.509	TDS= 699			
WOKING	Surface	03/18/92	TURB= 1.9				
WOKING	Surface	01/16/91	TURB= 1.2				
WORSLEY	Surface	02/13/90	MN= 0.115				
WORSLEY	Surface	09/17/91	TURB= 1.1				
WORSLEY	Surface	05/18/93	MN= 0.061				
ZAMA	Ground	10/23/91	SO4= 536	TURB= 3.9	TDS= 1044	MN= 0.499	
ZAMA	Ground	02/03/93	FE= 0.552	SO4= 622	TURB= 3.1	TDS= 115	MN= 0.339

APPENDIX E: SUMMARY OF FACILITY INVENTORY

FACILITY	STATUS	POPULATION	% Pop change	TYPE	SOURCE	RAW_STORAG m^3	TREATED_ST m^3	TREATMENT_	LAT	LONG	SURVEY SAMPLES	RAW SAMPLES	VISIT PLANNED
ANZAC	H	165		S				Cg/CgA/Flc/Sd/RSflt/NaOCl/TWR	56.450000	111.033333	X		
ATHABASCA	T	1975	-0.3%	S	Athabasca River		7092	Cg/CgA/pH/Sd/RSflt/AC/Flu/CL2/TWR	54.733333	113.250000	X	X	X
ATIKAMEG SCHOOL	S	0		S	Whitefish Band WTP			Prov for chlor/TWR	55.933333	115.650000			
BARRHEAD	T	4014	4.2%	S	Paddle River	363636	45454	RWR/Aer/Cg/Clr/Rflt/Flu/PPCl2/TWR	54.133333	114.400000	X		X
BEAR CANYON	WP	NA		S	Surface runoff	2700		Iron Removal,P. Filt.	56.183333	119.816667			
BEAR CANYON SCHOOL	S	0		S	Bear Canyon WP			RWR/Gsflt/PPNaOCl					
BEAVERLODGE	T	1808	-1.6%	S	Beaverlodge River	690909	3405	RWR/TWR/Aer/Cg/pH/Clr/Rflt/Cl2	55.216667	119.433333	X		
BERWYN	V	606	-12.1%	G			1091	Stor	56.150000	117.733333	X		X
BEZANSON	H	62		G			41	NT	55.233333	118.366667			
BEZANSON	O			G				Nil	55.233333	118.366667			
BEZANSON SCHOOL	S	0		G				Nil	55.233333	118.366667			
BISHOP ROTHIER(PEA	S	0		S	Hauled From Peavine WTP								
BLUE RIDGE	H	260		G			295	Nil	54.133333	115.366667	X		
BLUESKY	H	165		S	Surface runoff	65000	332	RWR/Aer/Rflt/NaOCl/TWR	56.066667	118.233333	X		
BONANZA	S	0		S	Dugout			Culligan Filters					
BORGEL WHITELAW	WP	NA		G				Nil					
BOYLE	V	704	-1.9%	S	Skeleton Lake(new pt.1992)		1899	T&O/Cg/CgA/Flc/Sed/pH/RSflt/PPCl2,CaOCl,NaOCl/TWR	54.583333	112.816667	X		
BROWNVALE	H	134		G			45	Nil	56.133333	117.883333			
BRULE	H	82		S	Supply Creek(GW 1992)		227	Pflt/NaOCl/TWR	53.283333	117.883333	X		
BUFFALO HEAD PRAIRI	WP	NA		S	surface runoff			P. Filt.	58.050000	116.316667			
BUFFALO HEAD PRAIRI	S	0		G	Hauled From Lacrete WTP			Nil	58.050000	116.316667			
CADOMIN	WP	114		G				Nil	53.033333	117.333333			
CADOTTE LAKE	WP	241		G			450	Aer/PAC/Cg/CgA/pH/Clr/RSflt/PPNaOCl/TWR	56.466667	116.366667			X
CALLING LAKE	H	330		S	Calling Lake(upgraded 1992)		64	Flc/Sd/Flt/NaOCl	55.250000	113.200000	X		
CALLING LAKE P.P.	PP			S	Calling Lake			I Gal.	55.216667	112.200000			
CANYON CREEK	H	367		S	Lesser Slave Lake	40000	818	RWR/Cg/CgA/Rflt/TO/pH/Cl2/TWR	54.366667	115.083333	X		
CARCAJOU	WP	NA		G									
CHERHILL	H	79			Private				53.816667	114.683333			
CHIP LAKE	S	0		S									
CHIPEWYAN LAKE	H	157		S	Chipewyan Lake		45	Filt. W.P.					
CHISHOLM	H	100		G				Nil,W.P.	54.916667	114.166667			
CLAIRMONT	H	443		G			909	Nil	55.266667	118.783333	X		
CLEARDALE	WP	25		S	Surface Runoff	35900	160	Comp.	56.333333	119.583333	X	X	
COLINTON	H	126		G			115	Fe re/GSflt/NaOCl/TWR	54.616667	113.250000	X		X
CONKLIN	H				Private				55.633333	111.083333			
CONKLIN	S	133		G			45	P.Filt, KMnO4, W.P.	55.633333	111.083333			
CROOKED CREEK	WP	NA		G				Nil	55.166667	117.866667			
CYNTHIA	H	56		G			227	Nil	53.283333	115.416667	X		X
DAPP	S	0		G									
DEADWOOD SCHOOL	S	0		S	H from Manning or Loc. WTP				56.733333	117.450000			
DEADWOOD WP	WP	NA		S	Spring			I.Gal.	56.733333	117.450000			
DEBOLT	H	106		G			45	NaOCl	55.216667	118.016667	X		
DEER HILL	WP	NA		G				Nil	56.283333	118.333333			
DESMARAIS	H	350		S	South Wabasca Lake	227000	1137	RWR/Cg/CgA/Clr/RSflt/TO/pH/PPCl2	55.933333	113.816667	X		X
DIXONVILLE 1	H	90		G			45	Nil	56.533333	117.666667			
DIXONVILLE 2	WP	NA		G				Nil					
DONNELLY	V	421	4.0%	S	Winagami Lake via canal	82500	530	RWR/Cg/Flc/RSflt/pH/NaOCl	55.733333	117.100000	X		
DR. MARY JACKSON	S	0		G				Fe re/Gsflt/CaOCl/TWR					
DUNVEGAN PROV.REC.	O	0		G				Nil					
EAGLESHAM	V	184	-6.6%	S	Surface runoff	86000	540	RWR/Cg/CgA/Clr/DMflt/Cl2	55.783333	117.883333	X		
EAST GRIMSHAW WATE	O			G				Nil					
EAST MANNING	WP	NA		S	Surface runoff			I Gal.					
EAST PRAIRIE SETTLEM	MS	260		G				Gsflt/NaOCl					
EDSON	T	7323	0.0%	G			7115	NaOCL2/TWR	53.583333	116.433333	X		X
ELMWORTH	S	0		G				Nil					
ENILDA	H	128		S	High Prairie WTP		91		55.416667	116.300000			
ENTWISTLE	V	478	-3.8%	G			680	GSflt/Fe re/Sc cnt/PPNaOCl2/TWR	53.600000	115.000000	X		
EUREKA RIVER	WP	4		G			5	Nil	56.450000	118.733333			

FACILITY	STATUS	POPULATION	% Pop. change	TYPE	SOURCE	RAW_STORAG m^3	TREATED_ST m^3	TREATMENT_	LAT	LONG	SURVEY SAMPLES	RAW SAMPLES	VISIT PLANNED
EVANSBURG	V	750	-3.6%	G			2272	Corr Cnt/NaOCl/TWR	53.600000	115.016667	X		
EVERGREEN PARK,AOR	O	0		G				Nil	55.166667	118.800000			
FAIRVIEW	T	3281	0.8%	S	Peace River	636400	682	RWR/Ar/Cg&A/pH/Sflt/TO/Flu/PPCl2/TWR	56.066667	118.383333	X	X	X
FAIRVIEW REGIONAL	O			S	Fairview WTP			Nil	56.066667	118.383333			
FALHER	T	1183	0.4%	S	Winagami Lake via canal	86360	322	Aer/Cg/CgA/Sd/Sft/pH/T&O/Clr/RSflt/Flu/CL2/TWR	55.733333	117.366667	X		X
FAUST	H	344		S	Slave Lake	88200	1023	RWR/TO/Cg/CgA/pH/Flc/Sd/RSflt/PPCl2/TWR	55.316667	115.633333	X		
FAWCETT	H	144		G			100	Fe re/GSflt/NaOCl/TWR	54.533333	114.083333	X		
FOOTNER LAKE	H	60		S	High Level WTP				58.616667	117.183333			
FORT ASSINIBOINE	V	214	-16.4%	G			21	Mn re/GSflt/NaOCl/TWR	54.333333	114.766667	X		
FORT CHIPEWYAN	H	1200		S	Lake Athabasca	84000	865	RWR/Cg/CgA/pH//RSflt/Cl2/TWR	58.700000	111.133333	X	X	X
FORT MACKAY	H	267		S	Ells River		18	RWR/Fere/Aer/Cg/CgA/pH/Flt/PPNaOCl	57.183333	111.616667	X		X
FORT MCMURRAY	C	33698	-0.7%	S	Athabasca River	45500	60000	Cg/CgA/TO/pH/Clr/DMflt/Flu/NH4/PPCl2/9TWR	56.733333	111.383333	X	X	X
FORT VERMILION	H	823		S	Peace River	100000	990	RWR/Cg/CgA/Clr/pH/Rflt/PPCL2/TWR	58.400000	116.000000	X		X
FOX CREEK	T	2068	9.3%	G			4818	GW/(1:GSflt/NaOCl/TWR)(1:NT)(3:FeRe/Seq/Cl2/TWR)	54.400000	116.800000	X		X
GIFT LAKE	MS	424		S	Gift Lake		850	Cg/CgA/Flc/Clr/pH/RSflt/NaOCl/TWR	55.883333	115.816667	X		X
GIROUXVILLE	V	367	-4.9%	S	Winagami Lake via canal	45455	818	RWR/Cg/Sd/Rflt/Sft/Cl2/TWR	55.750000	117.333333	X		
GOODWIN	WP	NA		G			10		55.216667	118.183333			
GRANDE CACHE	T	3842	5.4%	S	Victor Lake		4545	Fe re/Pflt/CL2/TWR	53.883333	119.133333	X		X
GRANDE PRAIRIE	C	28350	6.8%	S	Wapiti River	200000	26509	RWR/Cg/CgA/Flc/Sd/Rflt/Flu/PPCl2	55.166667	118.800000	X		X
GRANDE PRAIRIE	AP			G				Nil	55.166667	118.800000			
GRASSLAND	H	66		S&G	Surface runoff	22727	82	RWS/Aer/KMnO4/Cg/CgA/pH/Clar/RSflt/AC/NaOCl/TWR	54.816667	112.683333	X		
GREEN COURT	H	70			Private								
GRIFFIN CREEK	WP	NA		G				NT	56.016667	117.850000			
GRIMSHAW	T	2812	9.0%	G			5773	Flu/Cl2/TWR	56.183333	117.600000	X		X
GROUARD	H	352		S	Buffalo Bay/Lesser Slave	48500	705	Fe re-Aer,KMnO4/Cg/CgA/pH/Flc/Clr/Rflt/Cl2/TWR	55.516667	116.150000	X		
GUY	H	54		S	Surface runoff	40900	22	RWR/Pflt/PPCL2/TWR	55.550000	117.116667	X		
HARMON VALLEY	WP	NA		S	Surface runoff		14	I.Gal.	56.116667	116.833333			
HAWK HILLS	WP	10		S	Surface runoff		5	I.Gal.	57.233333	117.466667			
HIGH LEVEL	T	2921	-5.2%	S	Footner Lake	500060	2845	Cg/CgA/Clr/pH/Rflt/T&O/Flu/Cl2/R&TWR	58.516667	117.133333	X		X
HIGH PRAIRIE	T	2932	4.1%	S	West Prairie River	536428	4955	RWR/Aer/Cg/CgA/Clr/pH/Rflt/Flu/Cl2	55.433333	116.483333	X	X	X
HIGH PRAIRIE AIRPORT	AP	0			Bottled water			Nil	55.433333	116.483333			
HIGH PRAIRIE NW CO-O	O	0		S	High Prairie WTP			Nil	55.433333	116.483333			
HILLIARD BAY PROV P	PP	0		G				GSflt/Fe re/NaOCL2	55.516667	116.150000			
HILLTOP ESTATES	SD	23		G				Fe seq/NaOCl/TWR	55.166667	118.800000			
HINES CREEK	V	513	-17.9%	S	Jack Creek	136000	727	RWS/Aer/Cg/CgA/pH/Sd/Sflt/PPNaOCl	56.250000	118.600000	X	X	
HINTON	T	9893	4.8%	S	Athabasca River		5228	Comp. (Weldwood)	53.416667	117.566667	X	X	X
HOTCHKISS	WP	NA		S	Surface runoff		5	1 Gal	57.066667	117.550000			
HYTHE OFF/LIB	V	NA		G	Private				55.333333	119.550000			
JANVIER	H	435		S	Christina River	50000	31	RWR/Cg/Flc/RSflt/pH/NaOCl/TWR	55.933333	110.716667	X		X
JARVIE	H	102		G			68	Aer/Fe re/NaOCl	54.450000	113.983333	X		
JASPER NATIONAL PAR	NP	4475		S&G	Cabin Lake		1509	Nil	52.883333	118.083333			X
JEAN COTE	H	75		S	Surface runoff	45430	22	RWR/Pflt/PPCL2/TWR	55.900000	117.316667	X		
JOUSSARD	H	269		S	Lesser Slave Lake	9090	454	Cg/RSflt/NaOCl/TWR	55.366667	115.933333	X		
KEG RIVER	WP	NA		S	Surface Runoff		22	RWR/Cg/CgA/Flc/Clr/pH/MMFlt/NaOCl/TWR	57.800000	117.866667			
KINUSO	V	154	-18.4%	S	Faust WTP		455	NA	55.333333	115.416667			
LA CRETE	H	689		G			1136	Fe re/Pft/Sft/NaOCl	58.183333	116.400000	X		
LA GLACE	H	169		G	Private				55.400000	119.150000			
LAC LA BICHE	T	2553	0.2%	S	Lac La Biche		1134	RWR/Cg/Microflt/Pflt/TO/Flu/CL2/TWR	54.766667	111.966667	X		X
LITTLE BUFFALO	H	253		S	Hauled from Cadotte Lake		9	NA	56.433333	116.100000			
LITTLE SMOKY	H	39			Private								
LODGEPOLE	H	161		G	Private				53.100000	115.316667			
LOON LAKE	H	218		S	Red Earth Creek WTP		23	Prov for Dis/TWR	56.550000	115.400000	X		
MANNING	T	1144	-0.4%	S	Notikiwin River	163640	1830	RWR/Aer/Cg/Sd/pH/Rflt/Flu/Cl2/TWR	56.916667	117.616667	X		X
MANOLA	H	71		S	From Barrhead		91	Nil	54.100000	114.233333			
MARIE-REINE	WP	93		S	Surface runoff		14	RWR/Aer/Cg/Pflt/NaOCl/TWR	56.066667	117.283333	X		
MAYERTHORPE	T	1692	19.7%	G			3410	FeRe & Mnre/GSflt/Cl2	53.950000	116.133333	X		
MCINNIS (WELL #1)	WP	NA		G				Nil					
MCINNIS (WELL #2)	WP	NA		G				Nil					

FACILITY	STATUS	POPULATION	% Pop change	TYPE	SOURCE	RAW_STORAG m^3	TREATED_ST m^3	TREATMENT_	LAT	LONG	SURVEY SAMPLES	RAW SAMPLES	VISIT PLANNED
MCLENNAN	T	1026	2.7%	S	Winagami Lake via canal	207500	1300	RWR/Cg/CgA/pH/Clr/RSflt/Flu/PPCl2/TWR	55.700000	116.900000	X		
MILDRED LAKE/LOWER	I			S	Athabasca River	5910	36	Stdby Cl2	57.050000	111.583333			
MILDRED LAKE/UPPER	I			S	Athabasca River	17728	932	P.Filt., Polymer	57.050000	111.583333			
MITSUE IND. PARK	O	0		S	Lesser Slave River			P.Filt/Non-Potable	55.266667	114.616667			
MOONSHINE LAKE PRO	PP	0		S	Moonshine Lake			P.Filt	55.883333	119.216667			
NAMPA	WP	NA		S	Surface Runoff			I. Gal.	56.033333	117.133333	X		
NAMPA	V	496	6.9%	S	North Heart River	113650	1137	RWR/Aer/Cg/CgA/pH/Sd/Clr/Rflt/PPCL2/TWR	56.033333	117.133333			
NEERLANDIA	H	71		S	Baird Lake	22500	1360	RWR/Cg/CgA/Flc/Clr/pH/KMnO4/Flt/Cloram/TWR	54.333333	114.366667	X		
NEW FISH CREEK	WP	NA		G			18	Nil	55.300000	117.250000			
NITON JUNCTION	H	72			Private								
NORTH STAR	WP	NA		S	Surface runoff		11	I.Gal.	56.850000	117.633333			
PADDLE PRAIRIE	MS	470		S	Boyer River	68000	255	RWR/Aer/Cg/CgA/Flc/Sd/Flt/NaOCl	57.950000	117.483333	X		
PEACE RIVER	T	6696	6.8%	S	Peace River		14189	AC/Cg/CgA/Clr/Rflt/Flu/Cl2/TWR	56.233333	117.283333	X		X
PEACE RIVER AIRPORT	AP	0		G	East Grimshaw Co-op			Res/NaOCl	56.233333	117.283333			
PEACE RIVER C.C.	O	0		S	Peace River	4546	1795	RWR/Cg/CgA/pH/Clr/Flr	56.166667	117.416667			
PEACE RIVER PULP MIL	O								56.166667	117.416667			
PEAVINE	MS	363		S	South Heart River			RWS/Cg/CgA/MMflt/NaOCl					
PEERLESS LAKE	WP	253		S	Peerless Lake		100	Comp.	56.666667	114.583333	X		X
PEERLESS LAKE	S	0		S&G				Soft.	56.666667	114.583333			
PEERS	H	162		G	Private								
PEORIA	H	25		S	Surface runoff	16365	5	RWR/Pflt/NaOCL2/TWR	55.616667	118.283333	X		
PIBROCH	H	100		G			100	Gsflt/Fe re/NaOCl/TWR	54.266667	113.866667	X		
PICKARDVILLE	H	190		S	Pembina River (Westlock)		68	NaOCl/TWR	54.050000	113.883333			
PINE SHADOW ESTATES	MHP	200		G				Nil	53.383333	116.433333			
PLAMONDON	V	236	7.2%	S	Lac La Biche		714	Cg/RSflt/TO/pH/Cl2/TWR	54.850000	112.316667	X		
PUSKWASKAU	WP	NA		G				Nil	55.250000	117.650000			
QUBEN ELIZ.(LAC CARD	PP	0		G					54.050000	111.333333			
RAINBOW LAKE	T	817	21.0%	S	Surface runoff	318000	1576	RWR/Oxi/Aer/Cg/CgA/pH/RSflt/PPCl2/TWR	58.500000	119.383333	X		
RED EARTH	WP	NA		S	Red Earth Creek WTP				56.616667	115.300000			
REINWOOD	WP	NA		S	Surface runoff			Nil	56.733333	117.450000			
RENO	WP	20		S	Surface runoff	3182	14	I.Gal.	56.000000	117.000000			
RIDGE VALLEY	H	52		G			46	Nil	55.166667	117.866667			
RIDGE VALLEY	HC								55.166667	117.866667			
ROBB	WP	230		G	Private			Nil	53.216667	116.966667			
ROCHESTER	H	87			Private								
ROCHFORT BRIDGE	H				Private								
ROCKY LANE	WP	NA		S	Surface Runoff			P. Filt.	53.516667	116.366667			
ROCKY LANE SCHOOL	S	0		S	Hauled From Local WTP			Nil	53.516667	116.366667			
ROYCE	WP	NA		S	Surface Runoff	6820	1	RWR/MMflt/NaOCl	56.216667	114.966667			
RYCROFT	V	634	-5.7%	S	Spirit River	312000	1045	RWS/Aer/Cg/CgA/Clar/Sflt/PPCl2	55.750000	118.716667	X		
SANDY LAKE	H	NA		S	Sandy Lake	3300	773	RWR/MMFlt/ACFlt/NaOCl	56.000000	113.883333	X		
SANGUDO	V	368	3.6%	G			3	Fe seq/NaOCl/TWR	53.883333	114.900000	X		
SASKATOON ISLAND PR	PP	0		G				Gsflt/Fe re/NaOCl	55.200000	119.083333			
SEXSMITH	T	1256	0.3%	G			2728	TWR	55.350000	118.783333			X
SHELL PEACE R. INSITU	I	0		S	Peace River			Flt/Sft/AC/Chlor	56.233333	117.283333			
SIR WINSTON CHURCHI	PP	0		S	Lac La Biche		45	Pflt/Na OCl/TWR	54.833333	111.983333			
SLAVE LAKE	T	5607	3.3%	S	Lesser Slave Lake		4786	Cg/CgA/Flc/Sd/pH/T&O/Rflt/Flu/Cl2/TWR	55.283333	114.766667	X	X	X
SMITH	H	323		S	Athabasca River	32731	454	RWR/Cg/Pflt/CL2/TWR	55.166667	114.033333	X	X	X
SPIRIT RIVER	T	1044	-6.4%	S	Surface runoff	510556	1586	RWR/Cg/CgA/Flc/Sd/Clr/TO/pH/2RSflr/Flu/PPCl2	55.783333	118.833333	X		
ST. ISIDORE	H	90		S	Surface runoff	38600	185	2RWR/Aer/Cg/CgA/Flc/Clr/pH/RSflt/AC/NaOCl/TWR	56.200000	117.100000	X		
STRONG CREEK	WP	NA		G			11	Nil	56.166667	117.416667			
STURGEON HEIGHT CO	H				Private								
SUNSET HOUSE	WP	NA		G				Nil	55.116667	116.866667			
SUNSET HOUSE	S			G				Nil	55.116667	116.866667			
SWAN HILLS	T	2407	-2.3%	S	Freeman Lake		4546	Cg/Sed/Sft/pH/AC/Rflt/Flu/PPCl2/NaOCl/TWR	54.716667	115.400000	X		X
SWEATHOUSE	WP	NA		G			18	Nil	55.016667	116.883333			
T&E TRAILER PARK	MHP	150		G				Nil	55.166667	118.766667			
TANGENT	H	60		S	Surface runoff	25000	13	RWR/Pflt/NaOCl/TWR	55.800000	117.666667	X		X

FACILITY	STATUS	POPULATION	% Pop. change	TYPE	SOURCE	RAW_STORAG m^3	TREATED_ST m^3	TREATMENT_	LAT	LONG	SURVEY SAMPLES	RAW SAMPLES	VISIT PLANNED
TEEPEE CREEK	S	18		G				Iron Removal	55.366667	118.400000			X
THREE CREEKS	WP	NA		S	Surface Runoff		14	I.Gal.	56.350000	117.083333			
THUNDER LAKE PROV.P	PP	0		G				NaOCl (Apr 1 to Oct 31 each year)	54.116667	114.700000			
TOMKINS LANDING	WP	NA		S	Surface Runoff			P. Filt.	58.183333	116.400000			
TOMPKINS LANDING SC	S	0		S	Hauled From Local WP				58.183333	116.400000			
TRIPLE L T.P.	MHP	300		G			55	Nil	55.166667	118.683333			
TROUT LAKE	WP	290		G			33	Cg/CgA/Sd/Sft/Clr/Rflt/Fe re/NaOCl/TWR	56.500000	114.533333	X		
TROUT LAKE (KATERI)	S	100		S	Trout Lake			P.Filt	56.500000	114.533333			
VALHALLA	S	0		G				Nil					
VALLEYVIEW	T	2039	-0.4%	S	Sturgeon Creek	194000	3000	RWR/Cg/CgA/pH/Fe re/Sd/AC/RSflt/Flu/PPCl2/TWR	55.066667	117.283333	X		
VALLEYVIEW	HC			G					55.066667	117.283333			
WABASCA	H	501		S	North Wabasca Lake	15000	1050	RWR/Cg/CgA/Sd/pH/Pflt/ACflt/CL2/TWR	56.000000	113.883333	X		
WAGNER	WP	76		S	Canyon Creek WTP			NA					
WANDERING RIVER	H	43		S	Wandering River	27000	573	RWR/Cg/CgA/RSflt/pH/TO/NaOCl/TWR	55.200000	112.466667	X		X
WANHAM	V	216	-7.3%	S	Surface Runoff	50000	68	RWR/Cg/Sd/Rflt/CL2	55.733333	118.400000	X		
WARRENSVILLE	WP	NA		G				Nil	56.300000	117.666667			
WATINO	WP	66		G				Nil	55.716667	117.616667			
WEBERVILLE (#1)	WP	NA		G				Nil	56.283333	117.316667			
WEBERVILLE (#2)	WP	NA		G				Nil					
WEMBLEY	T	1382	11.5%	G			682	TWR	55.150000	119.133333			
WESTLOCK	T	4463	4.1%	S	Pembina River	256849	4546	RWR/Cg/CgA/AC/Sd/Rflt/Flu/PPCl2/TWR	54.150000	113.866667	X		X
WEYERHAEUSER GRAN	I												
WEYERHAEUSER GRAN	I			S	Wapiti River			Complete					
WHITE GULL	SV	0		G				NT (operated Apr 1 - Nov 1)					
WHITECOURT	T	6692	20.9%	S	Macleod River		10433	TO/Cg/CgA/Rflt/pH/Clr/Flu/Cl2/TWR	54.150000	115.683333	X	X	X
WHITELAW	H	139		S	Spring		114	NaOCl/TWR	56.116667	118.066667			
WHITELAW SPRING	WP	NA		S	Spring			NaOCL2/CLOSED Dec 5, 1991	56.116667	118.066667			
WIDEWATER	H	130		S	Canyon Creek WTP								
WILDWOOD	V	353		G			1318	Fe Seq/Cl2	53.616667	115.233333	X		
WILLIAMSON PROV.PK.	PP	0		G				GSflt/NaOCl	55.083333	117.550000			
WILLOW GROVE T.P.(H	SD	0		G				Iron Removal	55.333333	119.550000			
WINAGAMI LAKE P.P.	PP	0		S	Hauled From High Prairie				55.616667	116.650000			
WOKING	H	77		S	Surface Runoff	34060	78	RWR/Aer/Cg/CgA/Sd/Flt/NaOCl/TWR	55.583333	118.766667	X		X
WORSLEY	H	51		S	Eureka River	73640	418	RWR/Cg/CgA/Flc/flt/NaOCl	56.516667	119.133333	X	X	X
YOUNG'S POINT PROV.P	PP	0		G					55.066667	117.533333			
ZAMA	WP	NA		G				Nil	58.750000	119.083333	X		
ZAMA	H	178		G			472	Sft/Fe re/PPNaOCl	58.750000	119.083333			

STATUS CODES

C	City
T	Town
V	Village
H	Hamlet
SV	Summer Village
SD	Subdivision
PP	Provincial Park
MHP	Mobile Home Park
REG	Regional System
WCO	Water Cooperative
WP	Watering Point
IR	Indian Reserve
MS	Metis Settlement
S	School
O	Other

TREATMENT CODES

NT/	No Treatment
RWR/	Raw water reservoir
Cst/	Cistern
Alg/	Algae control
Oxi/	Oxidation
Aer/	Aeration
TO/	Taste and Odour control
Cg/	Coagulation
CgA/	Coagulant aid
Flc/	Flocculation
Clr/	Clarification
Sd/	Sedimentation
Cflt/	Carbon adsorption filtration
Msflt/	Micro strainer filtration
Pflt/	Pressure filtration
Sflt/	Slow sand filtration
Rflt/	Rapid sand filtration
Gsflt/	Manganese greensand filtration
MMflt/	Multi-media filtration

TREATMENT CODES

DMflt/	Dual-media filtration
CSep/	Cyclonic separation
Sft/	Softening
pH/	pH control
Fe re/	Iron removal
Fe seq/	Iron sequestering
Fe seq A/	Iron sequestering agent
Sc cntr/	Scale Control
Flu/	Fluoridation
NaOCl/	Disinfection with NaOCl
PPNaOCl/	Pre & post disinfection with NaOCl
Cl2/	Disinfection by chlorine gas
PPCl2/	Pre & post disinfection with chlorine gas
CaOCl/	Disinfection with CaOCl
PPCaOCl/	Pre & post disinfection with CaOCl
UV/	Disinfection by ultra-violet
SupCl/	Supplemental chlorination
NH3/	Disinfection by combined chlorination

APPENDIX F: SUMMARY OF RAW VS TREATED WATER COMPARISONS

LOCATION	DATE	PH pH units	FE mg/L	CA mg/L	HARD mg/L	K mg/L	NO23 mg/L	F mg/L	SO4 mg/L	T_ALK mg/L
ATHABASCA	18-Jan-90	7.7	.06	53	190	1.3	.12	.94	71	167
ATHABASCA RAW	18-Jan-90	8.5	.18	52	187	1.1	.12	.11	37	167
ATHABASCA DIFF	18-Jan-90	.8	.12	-1	-3	-.2	.00	-.83	-34	
ATHABASCA	19-Jun-90	7.0	.10	36	123	1.0	.05	.84	96	91
ATHABASCA RAW	19-Jun-90	7.6	19.32	27	100	1.0	.05	.08	11	95
ATHABASCA DIFF	19-Jun-90	.6	19.22	-9	-23	.0	.00	-.76	-85	4
ATHABASCA	16-Jan-91	7.5	.12	60	220	1.4	.14	.95	78	185
ATHABASCA RAW	16-Jan-91	7.8	.10	60	220	1.3	.14	.12	45	191
ATHABASCA DIFF	16-Jan-91	.3	-.02	0	0	-.1	.00	-.83	-33	6
ATHABASCA	16-Jul-91	7.3	.02	34	118	.6	.04	.66	75	88
ATHABASCA RAW	16-Jul-91	8.3	4.41	28	111	.6	.04	.07	16	104
ATHABASCA DIFF	16-Jul-91	1.0	4.39	-6	-7	.0	.00	-.59	-59	16
ATHABASCA	13-Mar-92	7.7	.11	43	161	2.3	.24	.81	70	147
ATHABASCA RAW	13-Mar-92	8.0	.67	39	147	2.6	.16	.10	30	147
ATHABASCA DIFF	13-Mar-92	.2	.56	-4	-14	.3	-.08	-.71	-40	
ATHABASCA	28-May-9	7.8	.02	37	134	.8	.01 <	.82	57	126
ATHABASCA RAW	28-May-9	8.4	.49	36	131	.8	.01 <	.08	21	120
ATHABASCA DIFF	28-May-9	.5	.48	-1	-3	.0	.00	-.74	-36	-6
ATHABASCA	13-Jan-93	8.1	.07	60	224	1.7	.11	.87	89	197
ATHABASCA RAW	13-Jan-93	8.2	.13	61	226	1.5	.12	.12	55	188
ATHABASCA DIFF	13-Jan-93	.2	.06	1	2	-.2	.01	-.75	-34	-9
CLEARDALE	18-May-9	7.0	.06	51	197	5.3	.03	.08	155	69
CLEARDALE RAW	18-May-9	8.0	.03	48	186	5.0	.01	.24	85	112
CLEARDALE DIFF	18-May-9	1.0	-.03	-3	-11	-.3	-.01	.16	-70	43
FAIRVIEW	19-May-9	7.4	.04	32	109	1.3	.01	.99	38	82
FAIRVIEW RAW	19-May-9	8.3	.03	31	106	1.3	.01 <	.07	21	94
FAIRVIEW DIFF	19-May-9	.9	-.01	-1	-3	.0	-.01	-.92	-17	12
FORT CHIPEWYAN	16-Jun-93	7.1	.05	9	35	.7	.01 <	.03	22	30
FORT CHIPEWYAN RAW	16-Jun-93	7.6	.63	10	37	.8	.01 <	.06	8	34
FORT CHIPEWYAN DIFF	16-Jun-93	.5	.58	1	2	.1	.00	.03	-14	4
FORT MCMURRAY	20-Jul-90	7.0	.03	29	105	1.2	.06	.99	53	91
FORT MCMURRAY RAW	20-Jul-90	7.8	.65	29	105	1.1	.07	.10	19	100
FORT MCMURRAY DIFF	20-Jul-90	.7	.61	0	0	-.1	.01	-.89	-34	9
FORT MCMURRAY	19-Nov-90	7.9	.02	44	168	1.1	.03	.90	54	143
FORT MCMURRAY RAW	19-Nov-90	8.2	.14	47	175	1.1	.02 <	.12	38	155
FORT MCMURRAY DIFF	19-Nov-90	.4	.11	3	7	.0	-.01	-.78	-16	12
FORT MCMURRAY	10-Apr-91	7.6	.03	52	196	1.6	.21	.77	69	178
FORT MCMURRAY RAW	10-Apr-91	8.0	.16	53	198	1.5	.19	.13	47	180
FORT MCMURRAY DIFF	10-Apr-91	.4	.14	1	2	-.1	-.02	-.64	-22	2
FORT MCMURRAY	27-Apr-92	7.8	.02	37	134	1.6	.03	.93	50	128
FORT MCMURRAY RAW	27-Apr-92	8.5	.37	36	131	1.4	.01 <	.09	26	123
FORT MCMURRAY DIFF	27-Apr-92	.6	.35	-1	-3	-.2	-.02	-.84	-24	-5
FORT MCMURRAY	19-Apr-93	7.8	.01	46	173	1.6	.05	.18	76	158
FORT MCMURRAY RAW	19-Apr-93	8.2	.13	46	173	1.6	.04	.12	54	163
FORT MCMURRAY DIFF	19-Apr-93	.4	.12	0	0	.0	-.01	-.06	-22	5

LOCATION	DATE	PH pH units	FE mg/L	CA mg/L	HARD mg/L	K mg/L	NO23 mg/L	F mg/L	SO4 mg/L	T_ALK mg/L
HIGH PRAIRIE	13-Feb-91	6.9	.01	50	174	2.4	.04	.74	138	118
HIGH PRAIRIE RAW	13-Feb-91	7.8	.39	52	183	2.3	.04	.11	48	148
HIGH PRAIRIE DIFF	13-Feb-91	1.0	.38	2	9	-.1	.00	-.63	-90	30
HINES CREEK	19-May-9	6.8	.10	37	134	9.0	.02	.02	118	51
HINES CREEK RAW	19-May-9	7.4	.64	36	131	8.9	.01 <	.11	47	98
HINES CREEK DIFF	19-May-9	.6	.54	-1	-3	-.1	-.02	.09	-71	47
HINTON	23-Oct-90	7.6	.15	59	209	.4	.06	.98	92	106
HINTON RAW	23-Oct-90	8.2	.22	45	174	.4	.06	.12	59	112
HINTON DIFF	23-Oct-90	.6	.08	-14	-35	.0	.00	-.86	-33	6
HINTON	12-Aug-91	8.0	.03	38	124	.3	.04	.90	43	84
HINTON RAW	12-Aug-91	8.1	4.31	26	94	.4	.05	.06	20	80
HINTON DIFF	12-Aug-91	.2	4.28	-12	-30	.1	.00	-.84	-23	-4
SLAVE LAKE	14-Feb-91	7.2	.09	27	92	2.9	.03	1.04	3 <	95
SLAVE LAKE RAW	14-Feb-91	7.5	.01 <	28	95	2.9	.04	.10	11	100
SLAVE LAKE DIFF	14-Feb-91	.3	-.08	1	3	.0	.01	-.94	8	5
SMITH	22-Jun-92	8.0	.04	46	164	1.2	.01	.09	48	137
SMITH RAW	22-Jun-92	8.3	1.25	34	118	.7	.04	.07	23	96
SMITH DIFF	22-Jun-92	.4	1.21	-12	-46	-.5	.04	-.02	-25	-41
SMITH	19-May-9	7.7	.02	44	163	.8	.01	.10	49	131
SMITH RAW	19-May-9	5.9	1.23	44	163	.9	.01 <	.01 <	201	28
SMITH DIFF	19-May-9	-1.8	1.22	0	0	.1	.00	-.09	152	-103
WHITECOURT	12-Feb-90	7.8	.10	64	224	1.1	.18	.94	14	242
WHITECOURT RAW	12-Feb-90	7.8	.11	55	211	1.0	.18	.10	15	248
WHITECOURT DIFF	12-Feb-90	.0	.01	-9	-13	-.1	.00	-.84	1	6
WHITECOURT	12-Jun-91	8.1	.04	46	152	.8	.01	.86	47	117
WHITECOURT RAW	12-Jun-91	8.5	.48	35	124	.7	.01 <	.08	13	129
WHITECOURT DIFF	12-Jun-91	.4	.44	-11	-28	-.1	-.01	-.78	-34	12
WHITECOURT	25-Feb-92	7.7	.01	70	237	1.1	.23	.98	34	232
WHITECOURT RAW	25-Feb-92	7.9	.10	64	226	1.1	.23	.10	10	247
WHITECOURT DIFF	25-Feb-92	.2	.09	-6	-11	.0	.00	-.88	-24	15
WHITECOURT	15-Oct-92	8.1	.00	55	195	1.0	.01 <	.93	44	181
WHITECOURT RAW	15-Oct-92	8.5	.09	49	180	1.1	.01 <	.10	21	196
WHITECOURT DIFF	15-Oct-92	.3	.08	-6	-15	.1	.00	-.83	-23	15
WORSLEY	18-May-9	7.2	.05	42	150	2.6	.01 <	.07	101	68
WORSLEY RAW	18-May-9	7.8	.38	41	148	2.5	.01 <	.14	55	105
WORSLEY DIFF	18-May-9	.6	.33	-1	-2	-.1	.00	.07	-46	37

LOCATION	DATE	TC_P	TURB NTU	COND mg/L	TDS mg/L	MN mg/L	NA mg/L	SIO2 mg/L	NO2_N mg/L	CL mg/L
ATHABASCA	18-Jan-90	0.08	0.2	471	275	0.006	32	6.0	0.001	3.2
ATHABASCA RAW	18-Jan-90	0.07	NA	388	217	0.004	10	5.9	0.004	2.5
ATHABASCA DIFF	18-Jan-90	-0.01		-83	-58	-0.002	-22	-.1	0.003	-.7
ATHABASCA	19-Jun-90	0.02 <	0.5	384	229	0.036	31	5.9	0.001	1.7
ATHABASCA RAW	19-Jun-90	13.10	370.0	207	110	0.464	4	5.6	0.002	1.3
ATHABASCA DIFF	19-Jun-90	13.08	369.5	-177	-119	0.428	-27	-.3	0.001	-.4
ATHABASCA	16-Jan-91	0.02 <	0.4	520	303	0.011	31	6.5	0.001	4.0
ATHABASCA RAW	16-Jan-91	0.06	1.2	453	254	0.004	13	6.5	0.005	2.9
ATHABASCA DIFF	16-Jan-91	0.04	0.8	-67	-49	-0.007	-18	.0	0.004	-1.1
ATHABASCA	16-Jul-91	0.02 <	0.1 <	340	193	0.009	21	4.4	0.001 <	2.0
ATHABASCA RAW	16-Jul-91	5.34	9.4	217	121	0.117	3	4.1	0.001	1.0
ATHABASCA DIFF	16-Jul-91	5.32	9.3	-123	-72	0.108	-18	-.3	0.000	-1.0
ATHABASCA	13-Mar-92	NA	0.4	450	256	0.013	32	6.6	0.001 <	7.2
ATHABASCA RAW	13-Mar-92	NA	9.1	357	193	0.022	15	6.4	0.016	6.1
ATHABASCA DIFF	13-Mar-92	NA	8.7	-93	-63	0.009	-17	-.2	0.015	-1.1
ATHABASCA	28-May-9	NA	0.1	373	211	0.003	28	4.5	0.001 <	2.5
ATHABASCA RAW	28-May-9	NA	9.4	276	149	0.028	7	4.0	0.001 <	1.7
ATHABASCA DIFF	28-May-9	NA	9.3	-97	-62	0.025	-21	-.5	0.000	-.8
ATHABASCA	13-Jan-93	0.09	0.3	570	335	0.007	40	5.6	0.001 <	8.3
ATHABASCA RAW	13-Jan-93	0.21	1.3	478	274	0.005	18	5.9	0.002	6.4
ATHABASCA DIFF	13-Jan-93	0.12	1.0	-92	-61	-0.002	-22	.3	0.001	-1.9
CLEARDALE	18-May-9	0.36	0.2	491	298	0.010	20	1.0	0.001 <	7.6
CLEARDALE RAW	18-May-9	NA	1.0	396	231	0.004	6	.5	0.003	2.8
CLEARDALE DIFF	18-May-9		0.7	-95	-67	-0.006	-14	-.5	0.002	-4.8
FAIRVIEW	19-May-9	0.57	0.2	254	137	0.017	6	2.1	0.001 <	2.8
FAIRVIEW RAW	19-May-9	NA	0.7	227	120	0.005	2	1.6	0.001 <	1.2
FAIRVIEW DIFF	19-May-9		0.5	-27	-17	-0.012	-4	-.5	0.000	-1.6
FORT CHIPEWYAN	16-Jun-93	0.30	0.2	120	67	0.003	9	2.2	0.001 <	5.4
FORT CHIPEWYAN RAW	16-Jun-93	0.57	15.1	89	50	0.009	4	2.3	0.001 <	4.3
FORT CHIPEWYAN DIFF	16-Jun-93	0.27	14.9	-31	-17	0.006	-5	.1	0.000	-1.1
FORT MCMURRAY	20-Jul-90	0.13	0.2	309	168	0.013	18	4.6	0.001	3.8
FORT MCMURRAY RAW	20-Jul-90	0.55	18.6	231	126	0.023	7	4.5	0.002	1.4
FORT MCMURRAY DIFF	20-Jul-90	0.42	18.4	-78	-42	0.010	-11	-.1	0.001	-2.4
FORT MCMURRAY	19-Nov-90	0.06	0.2	389	221	0.007	18	4.0	0.007	3.7
FORT MCMURRAY RAW	19-Nov-90	0.21	2.8	362	204	0.010	9	4.0	0.002	1.7
FORT MCMURRAY DIFF	19-Nov-90	0.15	2.6	-27	-17	0.003	-9	.0	-0.005	-2.0
FORT MCMURRAY	10-Apr-91	0.15	0.3	495	284	0.004	29	6.3	0.004	8.1
FORT MCMURRAY RAW	10-Apr-91	0.27	3.4	445	249	0.005	17	6.0	0.006	5.6
FORT MCMURRAY DIFF	10-Apr-91	0.12	3.1	-50	-35	0.001	-12	-.3	0.002	-2.5
FORT MCMURRAY	27-Apr-92	NA	0.3	375	207	0.003	25	4.5	0.011	5.6
FORT MCMURRAY RAW	27-Apr-92	NA	7.2	297	162	0.011	12	3.7	0.001 <	3.0
FORT MCMURRAY DIFF	27-Apr-92	NA	6.9	-78	-45	0.008	-13	-.8	-0.010	-2.6
FORT MCMURRAY	19-Apr-93	0.30	0.1	470	271	0.003	29	2.7	0.009	8.7
FORT MCMURRAY RAW	19-Apr-93	0.63	1.3	425	240	0.005	21	2.6	0.003	6.5
FORT MCMURRAY DIFF	19-Apr-93	0.33	1.2	-45	-31	0.002	-8	-.1	-0.006	-2.2

LOCATION	DATE	TC_P	TURB NTU	COND mg/L	TDS mg/L	MN mg/L	NA mg/L	SIO2 mg/L	NO2_N mg/L	CL mg/L
HIGH PRAIRIE	13-Feb-91	0.16	1.1	527	321	0.006	44	8.9	0.001	3.4
HIGH PRAIRIE RAW	13-Feb-91	NA	2.4	372	217	NA	11	10.0	0.002	1.5
HIGH PRAIRIE DIFF	13-Feb-91		1.3	-155	-104		-33	1.1	0.001	-1.9
HINES CREEK	19-May-9	1.30	1.9	388	229	0.034	18	3.3	0.002	6.7
HINES CREEK RAW	19-May-9	NA	3.2	299	168	0.080	4	3.6	0.002	3.5
HINES CREEK DIFF	19-May-9		1.3	-89	-61	0.046	-14	.3	0.000	-3.2
HINTON	23-Oct-90	0.23	3.9	396	233	0.013	2	3.6	0.001 <	1.2
HINTON RAW	23-Oct-90	0.56	11.1	331	190	0.010	2	3.7	0.001 <	.9
HINTON DIFF	23-Oct-90	0.33	7.2	-65	-43	-0.003		.1	0.000	-.3
HINTON	12-Aug-91	0.13	0.8	253	141	0.006	1 <	2.1	0.001 <	1.0
HINTON RAW	12-Aug-91	11.30	220.0	180	103	0.092	1	2.1	0.003	1.0
HINTON DIFF	12-Aug-91	11.17	219.2	-73	-38	0.086		.0	0.002	.0
SLAVE LAKE	14-Feb-91	0.03	0.4	227	106	0.012	7	1.4	0.001	3.8
SLAVE LAKE RAW	14-Feb-91	NA	0.5	222	117	NA	8	.9	0.010	1.1
SLAVE LAKE DIFF	14-Feb-91		0.1	-5	11		1	-.5	0.009	-2.7
SMITH	22-Jun-92	NA	0.9	372	208	0.002	12	2.6	0.001 <	6.5
SMITH RAW	22-Jun-92	NA	40.0	225	128	0.041	4	3.1	0.001	1.3
SMITH DIFF	22-Jun-92	NA	39.1	-147	-80	0.039	-8	.5	0.000	-5.2
SMITH	19-May-9	0.31	0.4	372	206	0.001 <	13	2.4	0.002	6.6
SMITH RAW	19-May-9	NA	NA	505	315	0.016	35	2.2	0.002	4.8
SMITH DIFF	19-May-9			133	109	0.015	22	-.2	0.000	-1.8
WHITECOURT	12-Feb-90	0.02 <	1.0	482	263	0.004	20	10.0	0.001	2.5
WHITECOURT RAW	12-Feb-90	0.10	1.4	482	260	0.007	20	9.5	0.003	1.2
WHITECOURT DIFF	12-Feb-90	0.08	0.4		-3	0.003		-.5	0.002	-1.3
WHITECOURT	12-Jun-91	0.02	0.4	323	181	0.002	6	3.7	0.002	2.0
WHITECOURT RAW	12-Jun-91	0.46	11.5	261	142	0.019	6	6.0	0.001 <	1.0
WHITECOURT DIFF	12-Jun-91	0.44	11.1	-62	-39	0.017		2.3	-0.001	-1.0
WHITECOURT	25-Feb-92	NA	0.1	510	284	0.004	21	9.4	0.009	3.0
WHITECOURT RAW	25-Feb-92	NA	1.4	481	263	0.006	21	9.6	0.010	1.3
WHITECOURT DIFF	25-Feb-92	NA	1.3	-29	-21	0.002		.2	0.001	-1.7
WHITECOURT	15-Oct-92	0.02 <	0.1	447	243	0.003	18	3.7	0.001 <	2.6
WHITECOURT RAW	15-Oct-92	0.04	1.2	411	221	0.006	18	4.0	0.001	1.2
WHITECOURT DIFF	15-Oct-92	0.02	1.1	-36	-22	0.003		.3	0.000	-1.4
WORSLEY	18-May-9	0.32	0.3	366	213	0.061	11	1.8	0.001 <	4.3
WORSLEY RAW	18-May-9	NA	3.2	317	179	0.070	6	2.1	0.001 <	.5
WORSLEY DIFF	18-May-9		2.9	-49	-34	0.009	-5	.3	0.000	-3.8

LOCATION	DATE	HCO3 mg/L	DOC mg/L	DIC mg/L	AS mg/L	B mg/L	CU mg/L	CD mg/L	Z mg/L	CR mg/L
ATHABASCA	18-Jan-90	204	4.0	41.2	0.0001 <	0.015	0.009	0.001 <	0.004	0.001 <
ATHABASCA RAW	18-Jan-90	192	6.7	40.2	0.0001	NA	0.004	0.002	0.008	0.001
ATHABASCA DIFF	18-Jan-90	-12	2.7	-1.0	0.0000		-0.005	0.001	0.004	0.000
ATHABASCA	19-Jun-90	111	3.0	24.0	0.0002	0.008	0.020	0.001 <	0.004	0.001
ATHABASCA RAW	19-Jun-90	116	11.4	23.3	0.0077	NA	0.028	0.003	0.071	0.022
ATHABASCA DIFF	19-Jun-90	5	8.4	-0.7	0.0075		0.008	0.002	0.067	0.021
ATHABASCA	16-Jan-91	226	3.7	45.6	0.0003	0.015	0.013	0.004	0.006	0.001
ATHABASCA RAW	16-Jan-91	233	5.5	45.6	0.0004	NA	0.007	0.001 <	0.006	0.002
ATHABASCA DIFF	16-Jan-91	7	1.8	0.0	0.0001		-0.006	-0.003	0.000	0.001
ATHABASCA	16-Jul-91	107	1.4	21.7	0.0001 <	0.006	0.014	0.001 <	0.004	0.002
ATHABASCA RAW	16-Jul-91	127	4.9	22.2	0.0018	NA	0.010	0.001	0.019	0.006
ATHABASCA DIFF	16-Jul-91	20	3.5	0.5	0.0017		-0.004	0.000	0.015	0.004
ATHABASCA	13-Mar-92	179	3.9	38.1	0.0003	0.013	0.016	0.001	0.007	0.001
ATHABASCA RAW	13-Mar-92	179	7.6	36.0	0.0006	NA	0.005	0.001 <	0.007	0.002
ATHABASCA DIFF	13-Mar-92		3.7	-2.1	0.0003		-0.011	0.000	0.000	0.001
ATHABASCA	28-May-9	154	2.7	30.3	0.0001	0.007	0.013	0.001	0.005	0.002
ATHABASCA RAW	28-May-9	145	5.9	27.2	0.0005	NA	0.003	0.002	0.005	0.002
ATHABASCA DIFF	28-May-9	-9	3.2	-3.1	0.0004		-0.010	0.001	0.000	0.000
ATHABASCA	13-Jan-93	240	3.8	44.3	0.0002	0.019	0.016	0.001 <	0.015	0.002
ATHABASCA RAW	13-Jan-93	229	5.8	42.0	0.0004	NA	0.004	0.001	0.004	0.002
ATHABASCA DIFF	13-Jan-93	-11	2.0	-2.3	0.0002		-0.012	0.000	-0.011	0.000
CLEARDALE	18-May-9	85	4.1	17.0	0.0002	0.051	0.038	0.001 <	0.025	0.001 <
CLEARDALE RAW	18-May-9	137	NA	NA	0.0003	NA	0.005	0.001 <	0.010	0.001 <
CLEARDALE DIFF	18-May-9	52			0.0001		-0.033	0.000	-0.015	0.000
FAIRVIEW	19-May-9	100	2.4	18.5	0.0001	0.008	0.030	0.001 <	0.001 <	0.001 <
FAIRVIEW RAW	19-May-9	115	NA	NA	0.0003	NA	0.057	0.001 <	0.002	0.001 <
FAIRVIEW DIFF	19-May-9	15			0.0002		0.027	0.000	0.001	0.000
FORT CHIPEWYAN	16-Jun-93	37	1.8	6.3	0.0001 <	0.009	0.056	0.001 <	0.005	0.001 <
FORT CHIPEWYAN RAW	16-Jun-93	41	3.3	6.8	0.0004	NA	0.002	0.001 <	0.009	0.001 <
FORT CHIPEWYAN DIFF	16-Jun-93	4	1.5	0.5	0.0003		-0.054	0.000	0.004	0.000
FORT MCMURRAY	20-Jul-90	111	4.1	20.2	0.0002	0.013	0.103	0.001 <	0.004	0.001
FORT MCMURRAY RAW	20-Jul-90	122	7.8	21.3	0.0006	NA	0.021	0.001	0.003	0.002
FORT MCMURRAY DIFF	20-Jul-90	11	3.7	1.1	0.0004		-0.082	0.000	-0.001	0.001
FORT MCMURRAY	19-Nov-90	174	3.0	32.5	0.0003	0.011	0.062	0.002	0.004	0.002
FORT MCMURRAY RAW	19-Nov-90	189	4.6	34.2	0.0003	NA	0.009	0.001	0.004	0.003
FORT MCMURRAY DIFF	19-Nov-90	15	1.6	1.7	0.0000		-0.053	-0.001	0.000	0.001
FORT MCMURRAY	10-Apr-91	217	4.1	39.9	0.0002	0.031	0.031	0.001	0.005	0.002
FORT MCMURRAY RAW	10-Apr-91	219	5.8	43.3	0.0004	NA	0.004	0.001 <	0.005	0.001
FORT MCMURRAY DIFF	10-Apr-91	2	1.7	3.4	0.0002		-0.027	0.000	0.000	-0.001
FORT MCMURRAY	27-Apr-92	156	4.4	30.0	0.0002	0.015	0.028	0.001	0.003	0.002
FORT MCMURRAY RAW	27-Apr-92	146	6.7	27.7	0.0004	NA	0.004	0.001 <	0.003	0.002
FORT MCMURRAY DIFF	27-Apr-92	-10	2.3	-2.3	0.0002		-0.024	0.000	0.000	0.000
FORT MCMURRAY	19-Apr-93	193	4.1	35.8	0.0002	0.030 NA	0.004	0.001 <	0.009	0.001
FORT MCMURRAY RAW	19-Apr-93	198	5.8	35.8	0.0003	NA	0.004	0.001 <	0.007	0.001
FORT MCMURRAY DIFF	19-Apr-93	5	1.7	0.0	0.0001	-0.030 NA	0.000	0.000	-0.002	0.000

LOCATION	DATE	HCO3 mg/L	DOC mg/L	DIC mg/L	AS mg/L	B mg/L	CU mg/L	CD mg/L	Z mg/L	CR mg/L
HIGH PRAIRIE	13-Feb-91	144	7.9	29.3	0.0001	0.023	0.070	0.001 <	0.001 <	0.001 <
HIGH PRAIRIE RAW	13-Feb-91	180	NA	NA	NA	NA	NA	NA	NA	NA
HIGH PRAIRIE DIFF	13-Feb-91	36								
HINES CREEK	19-May-9	62	6.3	11.5	0.0002	0.036	0.151	0.001 <	0.012	0.001 <
HINES CREEK RAW	19-May-9	119	NA	NA	0.0006	NA	0.020	0.001 <	0.004	0.001 <
HINES CREEK DIFF	19-May-9	57			0.0004		-0.131	0.000	-0.008	0.000
HINTON	23-Oct-90	129	0.6	25.6	0.0003	0.003	0.005	0.002	0.005	0.002
HINTON RAW	23-Oct-90	137	0.7	26.2	0.0001	NA	0.001 <	0.002	0.002	0.001 <
HINTON DIFF	23-Oct-90	8	0.1	0.6	-0.0002		-0.004	0.000	-0.003	-0.001
HINTON	12-Aug-91	102	0.3	18.2	0.0001	0.003	0.004	0.001 <	0.002	0.002
HINTON RAW	12-Aug-91	97	1.3	18.7	0.0015	NA	0.005	0.001	0.015	0.007
HINTON DIFF	12-Aug-91	-5	1.0	0.5	0.0014		0.001	0.000	0.013	0.005
SLAVE LAKE	14-Feb-91	116	10.5	21.3	0.0007	0.016	0.006	0.004	0.001 <	0.002
SLAVE LAKE RAW	14-Feb-91	122	NA	NA	NA	NA	NA	NA	NA	NA
SLAVE LAKE DIFF	14-Feb-91	6								
SMITH	22-Jun-92	167	2.5	34.3	0.0002	0.015	0.005	0.002	0.003	0.002
SMITH RAW	22-Jun-92	116	2.5	23.1	0.0006	NA	0.005	0.002	0.008	0.003
SMITH DIFF	22-Jun-92	-51	0.0	-11.2	0.0004		0.000	0.000	0.005	0.001
SMITH	19-May-9	160	2.6	31.3	0.0001	0.015	0.045	0.001 <	0.003	0.001 <
SMITH RAW	19-May-9	34	NA	NA	0.0003	NA	0.003	0.001 <	0.006	0.001 <
SMITH DIFF	19-May-9	-126			0.0002		-0.042	0.000	0.003	0.000
WHITECOURT	12-Feb-90	295	4.2	59.3	0.0003	0.015	0.027	0.001 <	0.001	0.001 <
WHITECOURT RAW	12-Feb-90	302	4.1	59.5	0.0002	NA	0.072	0.001 <	0.002	0.001 <
WHITECOURT DIFF	12-Feb-90	7	-0.1	0.2	-0.0001		0.045	0.000	0.001	0.000
WHITECOURT	12-Jun-91	143	4.4	27.3	0.0003	0.004	0.021	0.001	0.001 <	0.004
WHITECOURT RAW	12-Jun-91	154	6.1	29.5	0.0005	NA	0.041	0.002	0.002	0.004
WHITECOURT DIFF	12-Jun-91	11	1.7	2.2	0.0002		0.020	0.001	0.001	0.000
WHITECOURT	25-Feb-92	283	2.8	55.3	0.0001	0.016	0.015	0.002	0.004	0.004
WHITECOURT RAW	25-Feb-92	301	3.7	58.5	0.0003	NA	0.075	0.002	0.004	0.003
WHITECOURT DIFF	25-Feb-92	18	0.9	3.2	0.0002		0.060	0.000	0.000	-0.001
WHITECOURT	15-Oct-92	220	3.0	43.8	0.0002	0.015	0.001 <	0.001 <	0.001 <	0.002
WHITECOURT RAW	15-Oct-92	233	4.1	45.8	0.0004	NA	0.020	0.001 <	0.001 <	0.003
WHITECOURT DIFF	15-Oct-92	13	1.1	2.0	0.0002		0.019	0.000	0.000	0.001
WORSLEY	18-May-9	83	6.2	16.3	0.0001	0.044	0.057	0.001 <	0.017	0.001 <
WORSLEY RAW	18-May-9	128	NA	NA	0.0005	NA	0.012	0.001 <	0.020	0.001 <
WORSLEY DIFF	18-May-9	45			0.0004		-0.045	0.000	0.003	0.000

LOCATION	DATE	V mg/L	AL mg/L	TN_P	HG mg/L	SE mg/L	CO mg/L	NI mg/L	PB mg/L	MG mg/L
ATHABASCA	18-Jan-90	0.002 <	0.05	0.03	0.0002	0.0004	0.001 <	0.002	0.002 <	14.0
ATHABASCA RAW	18-Jan-90	0.002 <	0.01	0.02	0.0001	0.0001	0.005	0.006	0.013	14.0
ATHABASCA DIFF	18-Jan-90	0.000	-0.03	-0.01	-0.0001	-0.0003	0.004	0.004	0.011	0.0
ATHABASCA	19-Jun-90	0.002 <	0.03	0.02 <	0.0001 <	0.0001 <	0.001 <	0.002	0.002 <	8.0
ATHABASCA RAW	19-Jun-90	0.036	1.72	0.65	0.0001 <	0.0004	0.012	0.028	0.008	8.0
ATHABASCA DIFF	19-Jun-90	0.034	1.69	0.63	0.0000	0.0003	0.011	0.026	0.006	0.0
ATHABASCA	16-Jan-91	0.002 <	0.10	0.02 <	0.0001 <	0.0001 <	0.001 <	0.001 <	0.002 <	17.0
ATHABASCA RAW	16-Jan-91	0.003	0.02	0.02 <	0.0001 <	0.0001 <	0.001 <	0.003	0.002 <	17.0
ATHABASCA DIFF	16-Jan-91	0.001	-0.08	0.00	0.0000	0.0000	0.000	0.002	0.000	0.0
ATHABASCA	16-Jul-91	0.002	0.02	0.02 <	0.0001 <	0.0001 <	0.001	0.003	0.002 <	8.0
ATHABASCA RAW	16-Jul-91	0.010	0.55	0.21	0.0010 <	0.0001	0.004	0.009	0.004	10.0
ATHABASCA DIFF	16-Jul-91	0.008	0.53	0.19	0.0009	0.0000	0.003	0.006	0.002	2.0
ATHABASCA	13-Mar-92	0.002 <	0.08	NA	0.0001 <	0.0001 <	0.001 <	0.001	0.002 <	13.0
ATHABASCA RAW	13-Mar-92	0.002	0.03	NA	0.0001 <	0.0001 <	0.001 <	0.004	0.002 <	12.0
ATHABASCA DIFF	13-Mar-92	0.000	-0.05	NA	0.0000	0.0000	0.000	0.003	0.000	-1.0
ATHABASCA	28-May-9	0.002 <	0.02	NA	0.0001 <	0.0001 <	0.001 <	0.003	0.002 <	10.0
ATHABASCA RAW	28-May-9	0.002	0.08	NA	0.0001 <	0.0001	0.001 <	0.003	0.002 <	10.0
ATHABASCA DIFF	28-May-9	0.000	0.06	NA	0.0000	0.0000	0.000	0.000	0.000	0.0
ATHABASCA	13-Jan-93	0.003	0.12	0.03	0.0001 <	0.0001 <	0.001 <	0.003	0.002 <	18.0
ATHABASCA RAW	13-Jan-93	0.003	0.03	0.02	0.0001 <	0.0001 <	0.001 <	0.002	0.002 <	18.0
ATHABASCA DIFF	13-Jan-93	0.000	-0.09	-0.01	0.0000	0.0000	0.000	-0.001	0.000	0.0
CLEARDALE	18-May-9	0.002 <	0.04	0.02	0.0001 <	0.0001 <	0.001 <	0.001	0.002	17.0
CLEARDALE RAW	18-May-9	0.002 <	0.02	NA	NA	0.0002	0.001 <	0.001 <	0.004	16.0
CLEARDALE DIFF	18-May-9	0.000	-0.02			0.0001	0.000	0.000	0.002	-1.0
FAIRVIEW	19-May-9	0.002 <	0.09	0.04	0.0001 <	0.0001 <	0.001 <	0.001	0.002 <	7.0
FAIRVIEW RAW	19-May-9	0.002 <	0.01	NA	NA	0.0001 <	0.001 <	0.003	0.002 <	7.0
FAIRVIEW DIFF	19-May-9	0.000	-0.08			0.0000	0.000	0.002	0.000	0.0
FORT CHIPEWYAN	16-Jun-93	0.002 <	0.05	0.04	0.0001 <	0.0001 <	0.002	0.001 <	0.002	3.0
FORT CHIPEWYAN RAW	16-Jun-93	0.002 <	0.11	0.06	0.0001 <	0.0001 <	0.001 <	0.001 <	0.002 <	3.0
FORT CHIPEWYAN DIFF	16-Jun-93	0.000	0.06	0.02	0.0000	0.0000	-0.001	0.000	0.000	0.0
FORT MCMURRAY	20-Jul-90	0.002 <	0.27	0.02 <	0.0001 <	0.0001 <	0.001 <	0.001 <	0.003	8.0
FORT MCMURRAY RAW	20-Jul-90	0.003	0.26	0.04	0.0001	0.0001 <	0.001 <	0.003	0.004	8.0
FORT MCMURRAY DIFF	20-Jul-90	0.001	-0.01	0.02	0.0000	0.0000	0.000	0.002	0.001	0.0
FORT MCMURRAY	19-Nov-90	0.002	0.10	0.02 <	0.0001 <	0.0001 <	0.001 <	0.003	0.002	14.0
FORT MCMURRAY RAW	19-Nov-90	0.003	0.08	0.03	0.0001 <	0.0001	0.001	0.004	0.002 <	14.0
FORT MCMURRAY DIFF	19-Nov-90	0.001	-0.03	0.01	0.0000	0.0000	0.000	0.001	0.000	0.0
FORT MCMURRAY	10-Apr-91	0.002 <	0.21	0.02 <	0.0001 <	0.0001 <	0.001 <	0.002	0.002 <	16.0
FORT MCMURRAY RAW	10-Apr-91	0.002 <	0.26	0.05	0.0004	0.0001	0.001 <	0.001 <	0.002 <	16.0
FORT MCMURRAY DIFF	10-Apr-91	0.000	0.05	0.03	0.0003	0.0000	0.000	-0.001	0.000	0.0
FORT MCMURRAY	27-Apr-92	0.002	0.22	NA	0.0001	0.0001 <	0.001 <	0.001 <	0.002 <	10.0
FORT MCMURRAY RAW	27-Apr-92	0.002 <	0.05	NA	0.0001 <	0.0001	0.001 <	0.001 <	0.002 <	10.0
FORT MCMURRAY DIFF	27-Apr-92	0.000	-0.17	NA	0.0000	0.0000	0.000	0.000	0.000	0.0
FORT MCMURRAY	19-Apr-93	0.002 <	0.14	0.03	0.0001 <	0.0001	0.001 <	0.001	0.002 <	14.0
FORT MCMURRAY RAW	19-Apr-93	0.002 <	0.51	0.05	0.0001 <	0.0001	0.001 <	0.001	0.002 <	14.0
FORT MCMURRAY DIFF	19-Apr-93	0.000	0.37	0.02	0.0000	0.0000	0.000	0.000	0.000	0.0

LOCATION	DATE	V mg/L	AL mg/L	TN_P	HG mg/L	SE mg/L	CO mg/L	NI mg/L	PB mg/L	MG mg/L
HIGH PRAIRIE	13-Feb-91	0.002 <	0.43	0.02 <	0.0001 <	0.0001	0.001 <	0.001 <	0.002	12.0
HIGH PRAIRIE RAW	13-Feb-91	NA	NA	NA	NA	NA	NA	NA	NA	13.0
HIGH PRAIRIE DIFF	13-Feb-91									1.0
HINES CREEK	19-May-9	0.002 <	1.01	0.09	0.0001 <	0.0001 <	0.001 <	0.003	0.002 <	10.0
HINES CREEK RAW	19-May-9	0.002 <	0.02	NA	NA	0.0002	0.001 <	0.004	0.002 <	10.0
HINES CREEK DIFF	19-May-9	0.000	-0.99			0.0001	0.000	0.001	0.000	0.0
HINTON	23-Oct-90	0.002	0.96	0.02 <	0.0001 <	0.0001 <	0.001 <	0.003	0.002 <	15.0
HINTON RAW	23-Oct-90	0.002 <	0.04	0.02 <	0.0001 <	0.0001 <	0.001 <	0.003	0.002 <	15.0
HINTON DIFF	23-Oct-90	0.000	-0.93	0.00	0.0000	0.0000	0.000	0.000	0.000	0.0
HINTON	12-Aug-91	0.002 <	0.21	0.02 <	0.0002	0.0001 <	0.001 <	0.002	0.003	7.0
HINTON RAW	12-Aug-91	0.007	0.72	0.16	0.0001 <	0.0001 <	0.003	0.007	0.004	7.0
HINTON DIFF	12-Aug-91	0.005	0.51	0.14	-0.0001	0.0000	0.002	0.005	0.001	0.0
SLAVE LAKE	14-Feb-91	0.002 <	0.03	0.02 <	0.0001 <	0.0001 <	0.001 <	0.002	0.002 <	6.0
SLAVE LAKE RAW	14-Feb-91	NA	NA	NA	NA	NA	NA	NA	NA	6.0
SLAVE LAKE DIFF	14-Feb-91									0.0
SMITH	22-Jun-92	0.002	0.38	NA	0.0001 <	0.0001 <	0.001 <	0.003	0.002 <	12.0
SMITH RAW	22-Jun-92	0.004	0.14	NA	0.0001 <	0.0001	0.001	0.004	0.002 <	8.0
SMITH DIFF	22-Jun-92	0.002	-0.24	NA	0.0000	0.0000	0.000	0.001	0.000	-4.0
SMITH	19-May-9	0.002 <	0.22	0.03	0.0001 <	0.0001 <	0.001 <	0.001 <	0.002 <	13.0
SMITH RAW	19-May-9	0.002 <	40.10	NA	NA	0.0001	0.001	0.001	0.002 <	13.0
SMITH DIFF	19-May-9	0.000	39.88			0.0000	0.000	0.000	0.000	0.0
WHITECOURT	12-Feb-90	0.002 <	0.03	0.02 <	0.0001 <	0.0001 <	0.001 <	0.001 <	0.002 <	15.5
WHITECOURT RAW	12-Feb-90	0.002 <	0.02	0.05	0.0001 <	0.0001	0.001 <	0.001 <	0.002 <	18.0
WHITECOURT DIFF	12-Feb-90	0.000	-0.01	0.03	0.0000	0.0000	0.000	0.000	0.000	2.5
WHITECOURT	12-Jun-91	0.003	0.32	0.02 <	0.0001 <	0.0001 <	0.001	0.004	0.002 <	9.0
WHITECOURT RAW	12-Jun-91	0.004	0.11	0.04	0.0001 <	0.0002	0.001	0.005	0.002 <	9.0
WHITECOURT DIFF	12-Jun-91	0.001	-0.21	0.02	0.0000	0.0001	0.000	0.001	0.000	0.0
WHITECOURT	25-Feb-92	0.002	0.01 <	NA	0.0001 <	0.0001 <	0.001	0.006	0.002 <	15.0
WHITECOURT RAW	25-Feb-92	0.002	0.01 <	NA	0.0001 <	0.0001	0.001	0.006	0.002 <	16.0
WHITECOURT DIFF	25-Feb-92	0.000	0.00	NA	0.0000	0.0000	0.000	0.000	0.000	1.0
WHITECOURT	15-Oct-92	0.002	0.17	0.02 <	0.0001 <	0.0001 <	0.001 <	0.002	0.002 <	14.0
WHITECOURT RAW	15-Oct-92	0.003	0.02	0.02 <	0.0001 <	0.0002	0.001 <	0.003	0.002 <	14.0
WHITECOURT DIFF	15-Oct-92	0.001	-0.15	0.00	0.0000	0.0001	0.000	0.001	0.000	0.0
WORSLEY	18-May-9	0.002 <	0.06	0.02	0.0001 <	0.0001 <	0.001 <	0.003	0.003	11.0
WORSLEY RAW	18-May-9	0.002 <	0.02	NA	NA	0.0001	0.001 <	0.002	0.002 <	11.0
WORSLEY DIFF	18-May-9	0.000	-0.04			0.0000	0.000	-0.001	-0.001	0.0

LOCATION	DATE	BE mg/L	MO mg/L	BA mg/L	T_COLOR TCU	CO3 mg/L	TKN mg/L	NH3_N mg/L	T_PHOS mg/L	COD mg/L
ATHABASCA	18-Jan-90	0.001 <	0.002	0.063	NA	NA	NA	NA	NA	NA
ATHABASCA RAW	18-Jan-90	0.001 <	0.025	0.077	NA	6.0	NA	NA	NA	NA
ATHABASCA DIFF	18-Jan-90	0.000	0.023	0.014	NA	NA	NA	NA	NA	NA
ATHABASCA	19-Jun-90	0.001 <	0.001 <	0.099	NA	NA	NA	NA	NA	NA
ATHABASCA RAW	19-Jun-90	0.001 <	0.011	0.274	NA	NA	NA	NA	NA	NA
ATHABASCA DIFF	19-Jun-90	0.000	0.010	0.175	NA	NA	NA	NA	NA	NA
ATHABASCA	16-Jan-91	0.001 <	0.001 <	0.074	NA	NA	NA	NA	NA	NA
ATHABASCA RAW	16-Jan-91	0.001 <	0.001 <	0.088	NA	NA	NA	NA	NA	NA
ATHABASCA DIFF	16-Jan-91	0.000	0.000	0.014	NA	NA	NA	NA	NA	NA
ATHABASCA	16-Jul-91	0.001 <	0.002	0.069	NA	NA	NA	NA	NA	NA
ATHABASCA RAW	16-Jul-91	0.001 <	0.004	0.100	NA	NA	NA	NA	NA	NA
ATHABASCA DIFF	16-Jul-91	0.000	0.002	0.031	NA	NA	NA	NA	NA	NA
ATHABASCA	13-Mar-92	0.001 <	0.001 <	0.075	7.0	NA	NA	NA	NA	NA
ATHABASCA RAW	13-Mar-92	0.001 <	0.001 <	0.087	NA	NA	NA	NA	NA	NA
ATHABASCA DIFF	13-Mar-92	0.000	0.000	0.012		NA	NA	NA	NA	NA
ATHABASCA	28-May-9	0.001 <	0.001	0.063	NA	NA	NA	NA	0.0	NA
ATHABASCA RAW	28-May-9	0.001 <	0.001	0.065	NA	NA	0.3	0.0	0.0	NA
ATHABASCA DIFF	28-May-9	0.000	0.000	0.002	NA	NA	NA	NA	0.0	NA
ATHABASCA	13-Jan-93	0.001 <	0.003	0.082	NA	NA	NA	NA	NA	NA
ATHABASCA RAW	13-Jan-93	0.001 <	0.002	0.091	NA	NA	0.3	0.1	0.0	14.0
ATHABASCA DIFF	13-Jan-93	0.000	-0.001	0.009	NA	NA	NA	NA	NA	NA
CLEARDALE	18-May-9	0.001 <	0.001 <	0.082	NA	NA	0.3	0.1	0.0	NA
CLEARDALE RAW	18-May-9	0.001 <	0.002	0.083	NA	NA	0.6	0.1	0.0	NA
CLEARDALE DIFF	18-May-9	0.000	0.001	0.001	NA	NA	0.3	0.0	0.0	NA
FAIRVIEW	19-May-9	0.001 <	0.001 <	0.040	NA	NA	0.2	NA	0.0	NA
FAIRVIEW RAW	19-May-9	0.001 <	0.001	0.040	NA	NA	0.4	0.1	0.3	NA
FAIRVIEW DIFF	19-May-9	0.000	0.000	0.000	NA	NA	0.2	NA	0.3	NA
FORT CHIPEWYAN	16-Jun-93	0.001 <	0.001 <	0.024	NA	NA	0.1	0.0	0.0	NA
FORT CHIPEWYAN RAW	16-Jun-93	0.001 <	0.001 <	0.027	NA	NA	0.2	0.1	0.0	NA
FORT CHIPEWYAN DIFF	16-Jun-93	0.000	0.000	0.003	NA	NA	0.1	0.1	0.0	NA
FORT MCMURRAY	20-Jul-90	0.001 <	0.001 <	0.053	NA	NA	NA	NA	NA	NA
FORT MCMURRAY RAW	20-Jul-90	0.001 <	0.001 <	0.062	NA	NA	NA	NA	NA	NA
FORT MCMURRAY DIFF	20-Jul-90	0.000	0.000	0.009	NA	NA	NA	NA	NA	NA
FORT MCMURRAY	19-Nov-90	0.001 <	0.001 <	0.053	NA	NA	NA	NA	NA	NA
FORT MCMURRAY RAW	19-Nov-90	0.001 <	0.001 <	0.072	NA	NA	NA	NA	NA	NA
FORT MCMURRAY DIFF	19-Nov-90	0.000	0.000	0.019	NA	NA	NA	NA	NA	NA
FORT MCMURRAY	10-Apr-91	0.001 <	0.001 <	0.081	NA	NA	NA	NA	NA	NA
FORT MCMURRAY RAW	10-Apr-91	0.001 <	0.001 <	0.085	NA	NA	NA	NA	NA	NA
FORT MCMURRAY DIFF	10-Apr-91	0.000	0.000	0.004	NA	NA	NA	NA	NA	NA
FORT MCMURRAY	27-Apr-92	0.001 <	0.002	0.049	NA	NA	NA	NA	NA	NA
FORT MCMURRAY RAW	27-Apr-92	0.001 <	0.001	0.058	NA	NA	NA	NA	NA	NA
FORT MCMURRAY DIFF	27-Apr-92	0.000	-0.001	0.009	NA	NA	NA	NA	NA	NA
FORT MCMURRAY	19-Apr-93	0.001 <	0.001 <	0.056	NA	NA	0.3	0.0 <	0.0	NA
FORT MCMURRAY RAW	19-Apr-93	0.001 <	0.001 <	0.082	NA	NA	0.3	0.0 <	0.0	NA
FORT MCMURRAY DIFF	19-Apr-93	0.000	0.000	0.026	0.0 NA	0.0 NA	0.0	0.0	0.0	NA

LOCATION	DATE	BE mg/L	MO mg/L	BA mg/L	T_COLOR TCU	CO3 mg/L	TKN mg/L	NH3_N mg/L	T_PHOS mg/L	COD mg/L
HIGH PRAIRIE	13-Feb-91	0.001 <	0.001 <	0.052	NA	NA	NA	NA	NA	NA
HIGH PRAIRIE RAW	13-Feb-91	NA	NA	NA	NA	NA	NA	NA	NA	NA
HIGH PRAIRIE DIFF	13-Feb-91				NA	NA	NA	NA	NA	NA
HINES CREEK	19-May-9	0.001 <	0.001	0.033	NA	NA	0.4	0.1	0.0	NA
HINES CREEK RAW	19-May-9	0.001 <	0.001	0.037	NA	NA	1.5	0.1	0.1	NA
HINES CREEK DIFF	19-May-9	0.000	0.000	0.004	NA	NA	1.1	0.0	0.1	NA
HINTON	23-Oct-90	0.001 <	0.001 <	0.060	NA	NA	NA	NA	NA	NA
HINTON RAW	23-Oct-90	0.001 <	0.001 <	0.057	NA	NA	NA	NA	NA	NA
HINTON DIFF	23-Oct-90	0.000	0.000	-0.003	NA	NA	NA	NA	NA	NA
HINTON	12-Aug-91	0.001 <	0.001	0.033	NA	NA	NA	NA	NA	NA
HINTON RAW	12-Aug-91	0.001 <	0.003	0.058	NA	NA	NA	NA	NA	NA
HINTON DIFF	12-Aug-91	0.000	0.002	0.025	NA	NA	NA	NA	NA	NA
SLAVE LAKE	14-Feb-91	0.001 <	0.007	0.057	NA	NA	NA	NA	NA	NA
SLAVE LAKE RAW	14-Feb-91	NA	NA	NA	NA	NA	NA	NA	NA	NA
SLAVE LAKE DIFF	14-Feb-91				NA	NA	NA	NA	NA	NA
SMITH	22-Jun-92	0.001 <	0.003	0.098	1.0 <	NA	NA	NA	NA	NA
SMITH RAW	22-Jun-92	0.001 <	0.002	0.059	8.0	1.0 <	NA	NA	NA	NA
SMITH DIFF	22-Jun-92	0.000	-0.001	-0.039	7.0	NA	NA	NA	NA	NA
SMITH	19-May-9	0.001 <	0.001	0.090	3.0	NA	0.1	0.0	0.0 <	NA
SMITH RAW	19-May-9	0.001 <	0.002	0.091	NA	NA	NA	NA	NA	NA
SMITH DIFF	19-May-9	0.000	0.001	0.001		NA				NA
WHITECOURT	12-Feb-90	0.001 <	0.001 <	0.111	NA	NA	NA	NA	NA	NA
WHITECOURT RAW	12-Feb-90	0.001 <	0.001 <	0.112	NA	NA	NA	NA	NA	NA
WHITECOURT DIFF	12-Feb-90	0.000	0.000	0.001	NA	NA	NA	NA	NA	NA
WHITECOURT	12-Jun-91	0.001 <	0.002	0.067	NA	NA	NA	NA	NA	NA
WHITECOURT RAW	12-Jun-91	0.001 <	0.001 <	0.081	NA	2.0	NA	NA	NA	NA
WHITECOURT DIFF	12-Jun-91	0.000	-0.001	0.014	NA	NA	NA	NA	NA	NA
WHITECOURT	25-Feb-92	0.001 <	0.001	0.055	NA	NA	NA	NA	NA	NA
WHITECOURT RAW	25-Feb-92	0.001 <	0.002	0.106	NA	NA	NA	NA	NA	NA
WHITECOURT DIFF	25-Feb-92	0.000	0.001	0.051	NA	NA	NA	NA	NA	NA
WHITECOURT	15-Oct-92	0.001 <	0.002	0.052	7.0	NA	0.2	0.0	0.0	5.0
WHITECOURT RAW	15-Oct-92	0.001 <	0.002	0.095	15.0	NA	0.2	0.0	0.0	13.0
WHITECOURT DIFF	15-Oct-92	0.000	0.000	0.043	8.0	NA	0.1	0.0	0.0	8.0
WORSLEY	18-May-9	0.001 <	0.001 <	0.069	NA	NA	0.3	0.1	0.0	NA
WORSLEY RAW	18-May-9	0.001 <	0.001 <	0.074	NA	NA	0.6	0.1	0.0	NA
WORSLEY DIFF	18-May-9	0.000	0.000	0.005	NA	NA	0.3	0.0	0.0	NA

LOCATION	DATE	CYANIDE mg/L	LI	AI	LR
ATHABASCA	18-Jan-90	NA	-0.4	12.1	0.027
ATHABASCA RAW	18-Jan-90	NA	0.4	12.8	0.022
ATHABASCA DIFF	18-Jan-90	NA	0.7	0.8	-0.005
ATHABASCA	19-Jun-90	NA	-1.3	10.9	0.026
ATHABASCA RAW	19-Jun-90	NA	-0.8	11.4	0.019
ATHABASCA DIFF	19-Jun-90	NA	0.5	0.5	-0.007
ATHABASCA	16-Jan-91	NA	-0.5	12.0	0.031
ATHABASCA RAW	16-Jan-91	NA	-0.2	12.3	0.021
ATHABASCA DIFF	16-Jan-91	NA	0.3	0.3	-0.009
ATHABASCA	16-Jul-91	NA	-0.9	11.2	0.032
ATHABASCA RAW	16-Jul-91	NA	0.1	12.2	NA
ATHABASCA DIFF	16-Jul-91	NA	1.0	0.9	NA
ATHABASCA	13-Mar-92	0.0	-0.5	11.9	0.069
ATHABASCA RAW	13-Mar-92	NA	-0.3	12.1	0.059
ATHABASCA DIFF	13-Mar-92		0.2	0.2	-0.011
ATHABASCA	28-May-9	0.0 <	-0.5	11.9	0.028
ATHABASCA RAW	28-May-9	0.0 <	0.1	12.4	0.020
ATHABASCA DIFF	28-May-9	0.0	0.5	0.5	-0.008
ATHABASCA	13-Jan-93	0.0	0.1	12.5	0.059
ATHABASCA RAW	13-Jan-93	NA	0.2	12.7	0.048
ATHABASCA DIFF	13-Jan-93		0.2	0.2	-0.011
CLEARDALE	18-May-9	NA	-1.5	10.9	0.154
CLEARDALE RAW	18-May-9	NA	-0.3	12.1	0.035
CLEARDALE DIFF	18-May-9	NA	1.2	1.2	-0.119
FAIRVIEW	19-May-9	NA	-1.1	11.2	0.048
FAIRVIEW RAW	19-May-9	NA	-0.2	12.1	0.018
FAIRVIEW DIFF	19-May-9	NA	1.0	0.9	-0.030
FORT CHIPEWYAN	16-Jun-93	0.0 <	-2.2	9.9	0.251
FORT CHIPEWYAN RAW	16-Jun-93	NA	-1.6	10.6	0.181
FORT CHIPEWYAN DIFF	16-Jun-93		0.6	0.6	-0.071
FORT MCMURRAY	20-Jul-90	NA	-1.2	10.8	0.059
FORT MCMURRAY RAW	20-Jul-90	NA	-0.4	11.6	0.020
FORT MCMURRAY DIFF	20-Jul-90	NA	0.8	0.8	-0.039
FORT MCMURRAY	19-Nov-90	NA	-0.4	12.1	0.037
FORT MCMURRAY RAW	19-Nov-90	NA	0.1	12.5	0.015
FORT MCMURRAY DIFF	19-Nov-90	NA	0.4	0.4	-0.021
FORT MCMURRAY	10-Apr-91	NA	-0.4	12.0	0.064
FORT MCMURRAY RAW	10-Apr-91	NA	0.0	12.4	0.044
FORT MCMURRAY DIFF	10-Apr-91	NA	0.4	0.4	-0.020
FORT MCMURRAY	27-Apr-92	0.0 <	-0.4	11.9	0.062
FORT MCMURRAY RAW	27-Apr-92	NA	0.2	12.5	0.035
FORT MCMURRAY DIFF	27-Apr-92		0.6	0.6	-0.026
FORT MCMURRAY	19-Apr-93	NA	0.1	12.5	0.056
FORT MCMURRAY RAW	19-Apr-93	NA	0.1	12.5	0.056
FORT MCMURRAY DIFF	19-Apr-93	NA	0.0	0.0	0.000

LOCATION	DATE	CYANIDE mg/L	LI	AI	LR
HIGH PRAIRIE	13-Feb-91	NA	-1.4	11.0	0.041
HIGH PRAIRIE RAW	13-Feb-91	NA	-0.3	12.1	0.014
HIGH PRAIRIE DIFF	13-Feb-91	NA	1.1	1.1	-0.026
HINES CREEK	19-May-9	NA	-1.9	10.5	0.186
HINES CREEK RAW	19-May-9	NA	-0.9	11.4	0.051
HINES CREEK DIFF	19-May-9	NA	0.9	0.9	-0.135
HINTON	23-Oct-90	NA	-0.6	11.8	0.016
HINTON RAW	23-Oct-90	NA	0.0	12.3	0.011
HINTON DIFF	23-Oct-90	NA	0.5	0.5	-0.005
HINTON	12-Aug-91	NA	-0.2	11.9	NA
HINTON RAW	12-Aug-91	NA	-0.2	11.9	NA
HINTON DIFF	12-Aug-91	NA	0.0	0.0	NA
SLAVE LAKE	14-Feb-91	NA	-1.4	11.0	0.056
SLAVE LAKE RAW	14-Feb-91	NA	-1.0	11.4	0.015
SLAVE LAKE DIFF	14-Feb-91	NA	0.4	0.4	-0.041
SMITH	22-Jun-92	0.0 <	0.0	12.2	0.067
SMITH RAW	22-Jun-92	0.0 <	0.1	12.2	0.019
SMITH DIFF	22-Jun-92	0.0	0.1	0.1	-0.048
SMITH	19-May-9	0.0 <	-0.5	11.8	0.071
SMITH RAW	19-May-9	NA	-3.0	9.4	0.243
SMITH DIFF	19-May-9		-2.5	-2.4	0.172
WHITECOURT	12-Feb-90	NA	-0.1	12.4	0.015
WHITECOURT RAW	12-Feb-90	NA	-0.2	12.3	0.007
WHITECOURT DIFF	12-Feb-90	NA	-0.1	-0.1	-0.008
WHITECOURT	12-Jun-91	NA	0.0	12.2	0.024
WHITECOURT RAW	12-Jun-91	NA	0.3	12.5	NA
WHITECOURT DIFF	12-Jun-91	NA	0.3	0.3	NA
WHITECOURT	25-Feb-92	0.0 <	-0.1	12.3	0.018
WHITECOURT RAW	25-Feb-92	0.0 <	0.0	12.5	0.007
WHITECOURT DIFF	25-Feb-92	0.0	0.2	0.1	-0.011
WHITECOURT	15-Oct-92	0.0 <	0.1	12.5	0.020
WHITECOURT RAW	15-Oct-92	NA	0.5	12.8	0.009
WHITECOURT DIFF	15-Oct-92		0.3	0.3	-0.011
WORSLEY	18-May-9	NA	-1.3	11.0	0.089
WORSLEY RAW	18-May-9	NA	-0.5	11.8	0.007
WORSLEY DIFF	18-May-9	NA	0.8	0.8	-0.083

LOCATION	DATE	BENZENE ug/L	BROMOCHLORO-METHANE ug/L	BROMODICHL-OROMETHANE ug/L	BROMOFORM ug/L	BROMOMETHANE ug/L
ATHABASCA	18-Jan-90	1.0 U	1.0 U	1.0 X	1.0 U	1.0 U
ATHABASCA RAW	18-Jan-90	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
ATHABASCA DIFF	18-Jan-90	0.0	0.0	0.0	0.0	0.0
ATHABASCA	19-Jun-90	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
ATHABASCA RAW	19-Jun-90	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
ATHABASCA DIFF	19-Jun-90	0.0	0.0	0.0	0.0	0.0
ATHABASCA	16-Jan-91	1.0 U	1.0 U	1.0	1.0 U	1.0 U
ATHABASCA RAW	16-Jan-91	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
ATHABASCA DIFF	16-Jan-91	0.0	0.0	0.0	0.0	0.0
ATHABASCA	16-Jul-91	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
ATHABASCA RAW	16-Jul-91	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
ATHABASCA DIFF	16-Jul-91	0.0	0.0	0.0	0.0	0.0
ATHABASCA	13-Mar-92	1.0 U	1.0 U	1.0	1.0 U	1.0 U
ATHABASCA RAW	13-Mar-92	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
ATHABASCA DIFF	13-Mar-92	0.0	0.0	0.0	0.0	0.0
ATHABASCA	28-May-92	1.0 U	1.0 U	1.0 X	1.0 U	1.0 U
ATHABASCA RAW	28-May-92	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
ATHABASCA DIFF	28-May-92	0.0	0.0	0.0	0.0	0.0
ATHABASCA	13-Jan-93	1.0 U	1.0 U	1.0	1.0 U	1.0 U
ATHABASCA RAW	13-Jan-93	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
ATHABASCA DIFF	13-Jan-93	0.0	0.0	0.0	0.0	0.0
CLEARDALE	18-May-93	1.0 U	1.0 U	5.0	1.0 U	1.0 U
CLEARDALE RAW	18-May-93	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
CLEARDALE DIFF	18-May-93	0.0	0.0	-4.0	0.0	0.0
FAIRVIEW	19-May-93	1.0 U	1.0 U	1.0 X	1.0 U	1.0 U
FAIRVIEW RAW	19-May-93	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
FAIRVIEW DIFF	19-May-93	0.0	0.0	0.0	0.0	0.0
FORT CHIPEWYAN	16-Jun-93	1.0 U	1.0 U	8.0	1.0 U	1.0 U
FORT CHIPEWYAN RAW	16-Jun-93	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
FORT CHIPEWYAN DIFF	16-Jun-93	0.0	0.0	-7.0	0.0	0.0
FORT MCMURRAY	20-Jul-90	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
FORT MCMURRAY RAW	20-Jul-90	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
FORT MCMURRAY DIFF	20-Jul-90	0.0	0.0	0.0	0.0	0.0
FORT MCMURRAY	19-Nov-90	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
FORT MCMURRAY RAW	19-Nov-90	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
FORT MCMURRAY DIFF	19-Nov-90	0.0	0.0	0.0	0.0	0.0
FORT MCMURRAY	10-Apr-91	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
FORT MCMURRAY RAW	10-Apr-91	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
FORT MCMURRAY DIFF	10-Apr-91	0.0	0.0	0.0	0.0	0.0
FORT MCMURRAY - RAW	27-Apr-92	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
FORT MCMURRAY - RAW	27-Apr-92	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
FORT MCMURRAY - DIFF	27-Apr-92	0.0	0.0	0.0	0.0	0.0
FORT MCMURRAY	19-Apr-93	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
FORT MCMURRAY RAW	19-Apr-93	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
FORT MCMURRAY DIFF	19-Apr-93	0.0	0.0	0.0	0.0	0.0

LOCATION	DATE	BENZENE ug/L	BROMOCHLORO-METHANE ug/L	BROMODICHL-OROMETHANE ug/L	BROMOFORM ug/L	BROMOMETHANE ug/L
HIGH PRAIRIE	13-Feb-91	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
HIGH PRAIRIE RAW	13-Feb-91	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
HIGH PRAIRIE DIFF	13-Feb-91	0.0	0.0	0.0	0.0	0.0
HINES CREEK	19-May-93	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
HINES CREEK RAW	19-May-93	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
HINES CREEK DIFF	19-May-93	0.0	0.0	0.0	0.0	0.0
HINTON	23-Oct-90	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
HINTON RAW	23-Oct-90	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
HINTON DIFF	23-Oct-90	0.0	0.0	0.0	0.0	0.0
HINTON	12-Aug-91	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
HINTON RAW	12-Aug-91	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
HINTON DIFF	12-Aug-91	0.0	0.0	0.0	0.0	0.0
SLAVE LAKE	14-Feb-91	1.0 U	1.0 U	2.0	1.0 U	1.0 U
SLAVE LAKE RAW	14-Feb-91	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
SLAVE LAKE DIFF	14-Feb-91	0.0	0.0	-1.0	0.0	0.0
SMITH RAW	22-Jun-92	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
SMITH RAW	22-Jun-92	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
SMITH DIFF	22-Jun-92	0.0	0.0	0.0	0.0	0.0
SMITH	19-May-93	1.0 U	1.0 U	1.0	1.0 U	1.0 U
SMITH RAW	19-May-93	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
SMITH DIFF	19-May-93	0.0	0.0	0.0	0.0	0.0
WHITECOURT	12-Feb-90	1.0 U	1.0 U	1.0 X	1.0 U	1.0 U
WHITECOURT RAW	12-Feb-90	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
WHITECOURT DIFF	12-Feb-90	0.0	0.0	0.0	0.0	0.0
WHITECOURT	12-Jun-91	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
WHITECOURT RAW	12-Jun-91	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
WHITECOURT DIFF	12-Jun-91	0.0	0.0	0.0	0.0	0.0
WHITECOURT	25-Feb-92	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
WHITECOURT RAW	25-Feb-92	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
WHITECOURT DIFF	25-Feb-92	0.0	0.0	0.0	0.0	0.0
WHITECOURT	15-Oct-92	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
WHITECOURT RAW	15-Oct-92	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
WHITECOURT DIFF	15-Oct-92	0.0	0.0	0.0	0.0	0.0
WORSLEY	18-May-93	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
WORSLEY RAW	18-May-93	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
WORSLEY DIFF	18-May-93	0.0	0.0	0.0	0.0	0.0

LOCATION	DATE	CHLOROETHANE ug/L	CHLOROFORM ug/L	DIBROMOCHL-OROMETHANE ug/L	1,2,-DICHLORO-BENZENE ug/L	1,3,-DICHLORO-BENZENE ug/L
ATHABASCA	18-Jan-90	1.0 U	15.0	1.0 U	1.0 U	1.0 U
ATHABASCA RAW	18-Jan-90	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
ATHABASCA DIFF	18-Jan-90	0.0	-14.0	0.0	0.0	0.0
ATHABASCA	19-Jun-90	1.0 U	18.0	1.0 U	1.0 U	1.0 U
ATHABASCA RAW	19-Jun-90	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
ATHABASCA DIFF	19-Jun-90	0.0	-17.0	0.0	0.0	0.0
ATHABASCA	16-Jan-91	1.0 U	18.0	1.0 U	1.0 U	1.0 U
ATHABASCA RAW	16-Jan-91	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
ATHABASCA DIFF	16-Jan-91	0.0	-17.0	0.0	0.0	0.0
ATHABASCA	16-Jul-91	1.0 U	6.0	1.0 U	1.0 U	1.0 U
ATHABASCA RAW	16-Jul-91	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
ATHABASCA DIFF	16-Jul-91	0.0	-5.0	0.0	0.0	0.0
ATHABASCA	13-Mar-92	1.0 U	33.0	1.0 U	1.0 U	1.0 U
ATHABASCA RAW	13-Mar-92	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
ATHABASCA DIFF	13-Mar-92	0.0	-32.0	0.0	0.0	0.0
ATHABASCA	28-May-92	1.0 U	22.0	1.0 U	1.0 U	1.0 U
ATHABASCA RAW	28-May-92	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
ATHABASCA DIFF	28-May-92	0.0	-21.0	0.0	0.0	0.0
ATHABASCA	13-Jan-93	1.0 U	37.0	1.0 U	1.0 U	1.0 U
ATHABASCA RAW	13-Jan-93	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
ATHABASCA DIFF	13-Jan-93	0.0	-36.0	0.0	0.0	0.0
CLEARDALE	18-May-93	1.0 U	58.0	1.0 U	1.0 U	1.0 U
CLEARDALE RAW	18-May-93	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
CLEARDALE DIFF	18-May-93	0.0	-57.0	0.0	0.0	0.0
FAIRVIEW	19-May-93	1.0 U	1.0 B	1.0 U	1.0 U	1.0 U
FAIRVIEW RAW	19-May-93	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
FAIRVIEW DIFF	19-May-93	0.0	0.0	0.0	0.0	0.0
FORT CHIPEWYAN	16-Jun-93	1.0 U	1.0 B	2.0	1.0 U	1.0 U
FORT CHIPEWYAN RAW	16-Jun-93	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
FORT CHIPEWYAN DIFF	16-Jun-93	0.0	0.0	-1.0	0.0	0.0
FORT MCMURRAY	20-Jul-90	1.0 U	8.0	1.0 U	1.0 U	1.0 U
FORT MCMURRAY RAW	20-Jul-90	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
FORT MCMURRAY DIFF	20-Jul-90	0.0	-7.0	0.0	0.0	0.0
FORT MCMURRAY	19-Nov-90	1.0 U	3.0	1.0 U	1.0 U	1.0 U
FORT MCMURRAY RAW	19-Nov-90	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
FORT MCMURRAY DIFF	19-Nov-90	0.0	-2.0	0.0	0.0	0.0
FORT MCMURRAY	10-Apr-91	1.0 U	2.0	1.0 U	1.0 U	1.0 U
FORT MCMURRAY RAW	10-Apr-91	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
FORT MCMURRAY DIFF	10-Apr-91	0.0	-1.0	0.0	0.0	0.0
FORT MCMURRAY - RAW	27-Apr-92	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
FORT MCMURRAY - RAW	27-Apr-92	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
FORT MCMURRAY - DIFF	27-Apr-92	0.0	0.0	0.0	0.0	0.0
FORT MCMURRAY	19-Apr-93	1.0 U	1.0 B	1.0 U	1.0 U	1.0 U
FORT MCMURRAY RAW	19-Apr-93	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
FORT MCMURRAY DIFF	19-Apr-93	0.0	0.0	0.0	0.0	0.0

LOCATION	DATE	CHLOROETHANE ug/L	CHLOROFORM ug/L	DIBROMOCHL-OROMETHANE ug/L	1,2,-DICHLORO-BENZENE ug/L	1,3,-DICHLORO-BENZENE ug/L
HIGH PRAIRIE	13-Feb-91	1.0 U	55.0	1.0 U	1.0 U	1.0 U
HIGH PRAIRIE RAW	13-Feb-91	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
HIGH PRAIRIE DIFF	13-Feb-91	0.0	-54.0	0.0	0.0	0.0
HINES CREEK	19-May-93	1.0 U	1.0 B	1.0 U	1.0 U	1.0 U
HINES CREEK RAW	19-May-93	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
HINES CREEK DIFF	19-May-93	0.0	0.0	0.0	0.0	0.0
HINTON	23-Oct-90	1.0 U	3.0	1.0 U	1.0 U	1.0 U
HINTON RAW	23-Oct-90	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
HINTON DIFF	23-Oct-90	0.0	-2.0	0.0	0.0	0.0
HINTON	12-Aug-91	1.0 U	5.0	1.0 U	1.0 U	1.0 U
HINTON RAW	12-Aug-91	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
HINTON DIFF	12-Aug-91	0.0	-4.0	0.0	0.0	0.0
SLAVE LAKE	14-Feb-91	1.0 U	74.0	1.0 U	1.0 U	1.0 U
SLAVE LAKE RAW	14-Feb-91	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
SLAVE LAKE DIFF	14-Feb-91	0.0	-73.0	0.0	0.0	0.0
SMITH RAW	22-Jun-92	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
SMITH RAW	22-Jun-92	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
SMITH DIFF	22-Jun-92	0.0	0.0	0.0	0.0	0.0
SMITH	19-May-93	1.0 U	78.0	1.0 U	1.0 U	1.0 U
SMITH RAW	19-May-93	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
SMITH DIFF	19-May-93	0.0	-77.0	0.0	0.0	0.0
WHITECOURT	12-Feb-90	1.0 U	24.0	1.0 U	1.0 U	1.0 U
WHITECOURT RAW	12-Feb-90	1.0 U	1.0	1.0 U	1.0 U	1.0 U
WHITECOURT DIFF	12-Feb-90	0.0	-23.0	0.0	0.0	0.0
WHITECOURT	12-Jun-91	1.0 U	49.0	1.0 U	1.0 U	1.0 U
WHITECOURT RAW	12-Jun-91	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
WHITECOURT DIFF	12-Jun-91	0.0	-48.0	0.0	0.0	0.0
WHITECOURT	25-Feb-92	1.0 U	23.0	1.0 U	1.0 U	1.0 U
WHITECOURT RAW	25-Feb-92	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
WHITECOURT DIFF	25-Feb-92	0.0	-22.0	0.0	0.0	0.0
WHITECOURT	15-Oct-92	1.0 U	33.0	1.0 U	1.0 U	1.0 U
WHITECOURT RAW	15-Oct-92	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
WHITECOURT DIFF	15-Oct-92	0.0	-32.0	0.0	0.0	0.0
WORSLEY	18-May-93	1.0 U	63.0	1.0 U	1.0 U	1.0 U
WORSLEY RAW	18-May-93	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
WORSLEY DIFF	18-May-93	0.0	-62.0	0.0	0.0	0.0

LOCATION	DATE	1,4,-DICHLORO-BENZENE ug/L	METHALENE CHLORIDE ug/L	TOLUENE ug/L	1,1,1-TRICHLORO-ETHANE ug/L	TRICHLOROFLU-OROMETHANE ug/L
ATHABASCA	18-Jan-90	1.0 U	1.0 B	1.0 U	1.0 U	1.0 U
ATHABASCA RAW	18-Jan-90	1.0 U	1.0 B	1.0 U	1.0 U	1.0 U
ATHABASCA DIFF	18-Jan-90	0.0	0.0	0.0	0.0	0.0
ATHABASCA	19-Jun-90	1.0 U	1.0 B	1.0 U	1.0 U	1.0 U
ATHABASCA RAW	19-Jun-90	1.0 U	1.0 B	1.0 U	1.0 U	1.0 U
ATHABASCA DIFF	19-Jun-90	0.0	0.0	0.0	0.0	0.0
ATHABASCA	16-Jan-91	1.0 U	1.0 B	1.0 U	1.0 U	1.0 U
ATHABASCA RAW	16-Jan-91	1.0 U	1.0 B	1.0 U	1.0 U	1.0 U
ATHABASCA DIFF	16-Jan-91	0.0	0.0	0.0	0.0	0.0
ATHABASCA	16-Jul-91	1.0 U	1.0 B	1.0 U	1.0 U	1.0 U
ATHABASCA RAW	16-Jul-91	1.0 U	1.0 B	1.0 U	1.0 U	1.0 U
ATHABASCA DIFF	16-Jul-91	0.0	0.0	0.0	0.0	0.0
ATHABASCA	13-Mar-92	1.0 U	1.0 B	1.0 U	1.0 U	1.0 U
ATHABASCA RAW	13-Mar-92	1.0 U	1.0 B	1.0 U	1.0 U	1.0 U
ATHABASCA DIFF	13-Mar-92	0.0	0.0	0.0	0.0	0.0
ATHABASCA	28-May-92	1.0 X	1.0 B	1.0 U	1.0 U	1.0 U
ATHABASCA RAW	28-May-92	1.0 U	1.0 B	1.0 U	1.0 U	1.0 U
ATHABASCA DIFF	28-May-92	0.0	0.0	0.0	0.0	0.0
ATHABASCA	13-Jan-93	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
ATHABASCA RAW	13-Jan-93	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
ATHABASCA DIFF	13-Jan-93	0.0	0.0	0.0	0.0	0.0
CLEARDALE	18-May-93	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
CLEARDALE RAW	18-May-93	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
CLEARDALE DIFF	18-May-93	0.0	0.0	0.0	0.0	0.0
FAIRVIEW	19-May-93	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
FAIRVIEW RAW	19-May-93	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
FAIRVIEW DIFF	19-May-93	0.0	0.0	0.0	0.0	0.0
FORT CHIPEWYAN	16-Jun-93	2.0	1.0 U	1.0 U	1.0 U	1.0 U
FORT CHIPEWYAN RAW	16-Jun-93	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
FORT CHIPEWYAN DIFF	16-Jun-93	-1.0	0.0	0.0	0.0	0.0
FORT MCMURRAY	20-Jul-90	1.0 U	1.0 B	1.0 U	1.0 U	1.0 U
FORT MCMURRAY RAW	20-Jul-90	1.0 U	1.0 B	1.0 U	1.0 U	1.0 U
FORT MCMURRAY DIFF	20-Jul-90	0.0	0.0	0.0	0.0	0.0
FORT MCMURRAY	19-Nov-90	1.0 U	1.0 B	1.0 U	1.0 U	1.0 U
FORT MCMURRAY RAW	19-Nov-90	1.0 U	1.0 B	1.0 U	1.0 U	1.0 U
FORT MCMURRAY DIFF	19-Nov-90	0 0	0.0	0.0	0.0	0.0
FORT MCMURRAY	10-Apr-91	1.0 U	1.0 B	1.0 U	1.0 U	1.0 U
FORT MCMURRAY RAW	10-Apr-91	1.0 U	1.0 B	1.0 U	1.0 U	1.0 U
FORT MCMURRAY DIFF	10-Apr-91	0.0	0.0	0.0	0.0	0.0
FORT MCMURRAY - RAW	27-Apr-92	1.0 U	1.0 B	1.0 U	1.0 U	76.0
FORT MCMURRAY - RAW	27-Apr-92	1.0 U	1.0 B	1.0 U	1.0 U	76.0
FORT MCMURRAY - DIFF	27-Apr-92	0.0	0.0	0.0	0.0	0.0
FORT MCMURRAY	19-Apr-93	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
FORT MCMURRAY RAW	19-Apr-93	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
FORT MCMURRAY DIFF	19-Apr-93	0.0	0.0	0.0	0.0	0.0

LOCATION	DATE	1,4,-DICHLORO-BENZENE ug/L	METHALENE CHLORIDE ug/L	TOLUENE ug/L	1,1,1-TRICHLORO-ETHANE ug/L	TRICHLOROFLU-OROMETHANE ug/L
HIGH PRAIRIE	13-Feb-91	1.0 U	1.0 B	1.0 U	1.0 U	1.0 U
HIGH PRAIRIE RAW	13-Feb-91	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
HIGH PRAIRIE DIFF	13-Feb-91	0.0	0.0	0.0	0.0	0.0
HINES CREEK	19-May-93	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
HINES CREEK RAW	19-May-93	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
HINES CREEK DIFF	19-May-93	0.0	0.0	0.0	0.0	0.0
HINTON	23-Oct-90	3.0	1.0 B	1.0 U	1.0 U	1.0 U
HINTON RAW	23-Oct-90	1.0 U	1.0 B	1.0 U	1.0 U	1.0 U
HINTON DIFF	23-Oct-90	-2.0	0.0	0.0	0.0	0.0
HINTON	12-Aug-91	5.0	1.0 B	1.0 U	1.0 U	1.0 U
HINTON RAW	12-Aug-91	1.0 U	1.0 B	1.0 U	1.0 U	1.0 U
HINTON DIFF	12-Aug-91	-4.0	0.0	0.0	0.0	0.0
SLAVE LAKE	14-Feb-91	1.0 U	1.0 B	1.0 U	1.0 U	1.0 U
SLAVE LAKE RAW	14-Feb-91	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
SLAVE LAKE DIFF	14-Feb-91	0.0	0.0	0.0	0.0	0.0
SMITH RAW	22-Jun-92	1.0 U	1.0 B	1.0 U	1.0 U	1.0 U
SMITH RAW	22-Jun-92	1.0 U	1.0 B	1.0 U	1.0 U	1.0 U
SMITH DIFF	22-Jun-92	0.0	0.0	0.0	0.0	0.0
SMITH	19-May-93	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
SMITH RAW	19-May-93	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
SMITH DIFF	19-May-93	0.0	0.0	0.0	0.0	0.0
WHITECOURT	12-Feb-90	1.0 U	1.0 B	1.0 U	1.0 U	1.0 U
WHITECOURT RAW	12-Feb-90	1.0 U	1.0 B	1.0 U	1.0 U	1.0 U
WHITECOURT DIFF	12-Feb-90	0.0	0.0	0.0	0.0	0.0
WHITECOURT	12-Jun-91	1.0 U	1.0 B	1.0 U	1.0 U	1.0 U
WHITECOURT RAW	12-Jun-91	1.0 U	1.0 B	1.0 U	1.0 U	1.0 U
WHITECOURT DIFF	12-Jun-91	0.0	0.0	0.0	0.0	0.0
WHITECOURT	25-Feb-92	1.0 U	1.0 B	1.0 B	1.0 U	1.0 U
WHITECOURT RAW	25-Feb-92	1.0 U	1.0 B	1.0 B	1.0 U	1.0 U
WHITECOURT DIFF	25-Feb-92	0.0	0.0	0.0	0.0	0.0
WHITECOURT	15-Oct-92	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
WHITECOURT RAW	15-Oct-92	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
WHITECOURT DIFF	15-Oct-92	0.0	0.0	0.0	0.0	0.0
WORSLEY	18-May-93	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
WORSLEY RAW	18-May-93	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
WORSLEY DIFF	18-May-93	0.0	0.0	0.0	0.0	0.0

LOCATION	DATE	o-XYLENE ug/L	m,p-XYLENE ug/L
ATHABASCA	18-Jan-90	1.0 U	1.0 U
ATHABASCA RAW	18-Jan-90	1.0 U	1.0 U
ATHABASCA DIFF	18-Jan-90	0.0	0.0
ATHABASCA	19-Jun-90	1.0 U	1.0 U
ATHABASCA RAW	19-Jun-90	1.0 U	1.0 U
ATHABASCA DIFF	19-Jun-90	0.0	0.0
ATHABASCA	16-Jan-91	1.0 U	1.0 U
ATHABASCA RAW	16-Jan-91	1.0 U	1.0 U
ATHABASCA DIFF	16-Jan-91	0.0	0.0
ATHABASCA	16-Jul-91	1.0 U	1.0 U
ATHABASCA RAW	16-Jul-91	1.0 U	1.0 U
ATHABASCA DIFF	16-Jul-91	0.0	0.0
ATHABASCA	13-Mar-92	1.0 U	1.0 U
ATHABASCA RAW	13-Mar-92	1.0 U	1.0 U
ATHABASCA DIFF	13-Mar-92	0.0	0.0
ATHABASCA	28-May-92	1.0 U	1.0 U
ATHABASCA RAW	28-May-92	1.0 U	1.0 U
ATHABASCA DIFF	28-May-92	0.0	0.0
ATHABASCA	13-Jan-93	1.0 U	1.0 U
ATHABASCA RAW	13-Jan-93	1.0 U	1.0 U
ATHABASCA DIFF	13-Jan-93	0.0	0.0
CLEARDALE	18-May-93	1.0 U	1.0 U
CLEARDALE RAW	18-May-93	1.0 U	1.0 U
CLEARDALE DIFF	18-May-93	0.0	0.0
FAIRVIEW	19-May-93	1.0 U	1.0 U
FAIRVIEW RAW	19-May-93	1.0 U	1.0 U
FAIRVIEW DIFF	19-May-93	0.0	0.0
FORT CHIPEWYAN	16-Jun-93	1.0 U	1.0 U
FORT CHIPEWYAN RAW	16-Jun-93	1.0 U	1.0 U
FORT CHIPEWYAN DIFF	16-Jun-93	0.0	0.0
FORT MCMURRAY	20-Jul-90	1.0 U	1.0 U
FORT MCMURRAY RAW	20-Jul-90	1.0 U	1.0 U
FORT MCMURRAY DIFF	20-Jul-90	0.0	0.0
FORT MCMURRAY	19-Nov-90	1.0 U	1.0 U
FORT MCMURRAY RAW	19-Nov-90	1.0 U	1.0 U
FORT MCMURRAY DIFF	19-Nov-90	0.0	0.0
FORT MCMURRAY	10-Apr-91	1.0 U	1.0 U
FORT MCMURRAY RAW	10-Apr-91	1.0 U	1.0 U
FORT MCMURRAY DIFF	10-Apr-91	0.0	0.0
FORT MCMURRAY - RAW	27-Apr-92	1.0 U	1.0 U
FORT MCMURRAY - RAW	27-Apr-92	1.0 U	1.0 U
FORT MCMURRAY - DIFF	27-Apr-92	0.0	0.0
FORT MCMURRAY	19-Apr-93	1.0 U	1.0 U
FORT MCMURRAY RAW	19-Apr-93	1.0 U	1.0 U
FORT MCMURRAY DIFF	19-Apr-93	0.0	0.0

LOCATION	DATE	o-XYLENE ug/L	m,p-XYLENE ug/L
HIGH PRAIRIE	13-Feb-91	1.0 U	1.0 U
HIGH PRAIRIE RAW	13-Feb-91	1.0 U	1.0 U
HIGH PRAIRIE DIFF	13-Feb-91	0.0	0.0
HINES CREEK	19-May-93	1.0 U	1.0 U
HINES CREEK RAW	19-May-93	1.0 U	1.0 U
HINES CREEK DIFF	19-May-93	0.0	0.0
HINTON	23-Oct-90	1.0 U	1.0 U
HINTON RAW	23-Oct-90	1.0 U	1.0 U
HINTON DIFF	23-Oct-90	0.0	0.0
HINTON	12-Aug-91	1.0 U	1.0 U
HINTON RAW	12-Aug-91	1.0 U	1.0 U
HINTON DIFF	12-Aug-91	0.0	0.0
SLAVE LAKE	14-Feb-91	1.0 U	1.0 U
SLAVE LAKE RAW	14-Feb-91	1.0 U	1.0 U
SLAVE LAKE DIFF	14-Feb-91	0.0	0.0
SMITH RAW	22-Jun-92	1.0 U	1.0 U
SMITH RAW	22-Jun-92	1.0 U	1.0 U
SMITH DIFF	22-Jun-92	0.0	0.0
SMITH	19-May-93	1.0 U	1.0 U
SMITH RAW	19-May-93	1.0 U	1.0 U
SMITH DIFF	19-May-93	0.0	0.0
WHITECOURT	12-Feb-90	1.0 U	1.0 U
WHITECOURT RAW	12-Feb-90	1.0 U	1.0 U
WHITECOURT DIFF	12-Feb-90	0.0	0.0
WHITECOURT	12-Jun-91	1.0 U	1.0 U
WHITECOURT RAW	12-Jun-91	1.0 U	1.0 U
WHITECOURT DIFF	12-Jun-91	0.0	0.0
WHITECOURT	25-Feb-92	1.0 U	1.0 U
WHITECOURT RAW	25-Feb-92	1.0 U	1.0 U
WHITECOURT DIFF	25-Feb-92	0.0	0.0
WHITECOURT	15-Oct-92	1.0 U	1.0 U
WHITECOURT RAW	15-Oct-92	1.0 U	1.0 U
WHITECOURT DIFF	15-Oct-92	0.0	0.0
WORSLEY	18-May-93	1.0 U	1.0 U
WORSLEY RAW	18-May-93	1.0 U	1.0 U
WORSLEY DIFF	18-May-93	0.0	0.0

LOCATION	DATE	HEXADECANOIC ACID ug/L	BUTYLBENZYL-PHTHALATE ug/L	DIETHYL-PHTHALATE ug/L	Di-n-OCTYL-PHTHALATE ug/L	BIS(2-ETHYLHE-XYL)PHTHALATE ug/L
ATHABASCA	18-Jan-90	3.0	1.0 U	1.0 U	1.0 U	1.0 U
ATHABASCA RAW	18-Jan-90	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
ATHABASCA DIFF	18-Jan-90	-2.0	0.0	0.0	0.0	0.0
ATHABASCA	19-Jun-90	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
ATHABASCA RAW	19-Jun-90	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
ATHABASCA DIFF	19-Jun-90	0.0	0.0	0.0	0.0	0.0
ATHABASCA	16-Jan-91	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
ATHABASCA RAW	16-Jan-91	1.0 U	1.0 U	1.0 U	1.0 U	8.0
ATHABASCA DIFF	16-Jan-91	0.0	0.0	0.0	0.0	7.0
ATHABASCA	16-Jul-91	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
ATHABASCA RAW	16-Jul-91	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
ATHABASCA DIFF	16-Jul-91	0.0	0.0	0.0	0.0	0.0
ATHABASCA	13-Mar-92	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
ATHABASCA RAW	13-Mar-92	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
ATHABASCA DIFF	13-Mar-92	0.0	0.0	0.0	0.0	0.0
ATHABASCA	28-May-92	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
ATHABASCA RAW	28-May-92	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
ATHABASCA DIFF	28-May-92	0.0	0.0	0.0	0.0	0.0
ATHABASCA	13-Jan-93	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
ATHABASCA RAW	13-Jan-93	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
ATHABASCA DIFF	13-Jan-93	0.0	0.0	0.0	0.0	0.0
CLEARDALE	18-May-93	1.0 U	1.0 U	1.0 U	1.0 U	1.0
CLEARDALE RAW	18-May-93	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
CLEARDALE DIFF	18-May-93	0.0	0.0	0.0	0.0	0.0
FAIRVIEW	19-May-93	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
FAIRVIEW RAW	19-May-93	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
FAIRVIEW DIFF	19-May-93	0.0	0.0	0.0	0.0	0.0
FORT CHIPEWYAN	16-Jun-93	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
FORT CHIPEWYAN RAW	16-Jun-93	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
FORT CHIPEWYAN DIFF	16-Jun-93	0.0	0.0	0.0	0.0	0.0
FORT MCMURRAY	20-Jul-90	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
FORT MCMURRAY RAW	20-Jul-90	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
FORT MCMURRAY DIFF	20-Jul-90	0.0	0.0	0.0	0.0	0.0
FORT MCMURRAY	19-Nov-90	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
FORT MCMURRAY RAW	19-Nov-90	1.0 U	1.0 U	1.0 U	1.0 U	4.0
FORT MCMURRAY DIFF	19-Nov-90	0.0	0.0	0.0	0.0	3.0
FORT MCMURRAY	10-Apr-91	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
FORT MCMURRAY RAW	10-Apr-91	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
FORT MCMURRAY DIFF	10-Apr-91	0.0	0.0	0.0	0.0	0.0
FORT MCMURRAY - RAW	27-Apr-92	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
FORT MCMURRAY - RAW	27-Apr-92	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
FORT MCMURRAY - DIFF	27-Apr-92	0.0	0.0	0.0	0.0	0.0
FORT MCMURRAY	19-Apr-93	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
FORT MCMURRAY RAW	19-Apr-93	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
FORT MCMURRAY DIFF	19-Apr-93	0.0	0.0	0.0	0.0	0.0

LOCATION	DATE	HEXADECANOIC ACID ug/L	BUTYLBENZYL-PHTHALATE ug/L	DIETHYL-PHTHALATE ug/L	DI-n-OCTYL-PHTHALATE ug/L	BIS(2-ETHYLHE-XYL)PHTHALATE ug/L
HIGH PRAIRIE	13-Feb-91	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
HIGH PRAIRIE RAW	13-Feb-91	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
HIGH PRAIRIE DIFF	13-Feb-91	0.0	0.0	0.0	0.0	0.0
HINES CREEK	19-May-93	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
HINES CREEK RAW	19-May-93	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
HINES CREEK DIFF	19-May-93	0.0	0.0	0.0	0.0	0.0
HINTON	23-Oct-90	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
HINTON RAW	23-Oct-90	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
HINTON DIFF	23-Oct-90	0.0	0.0	0.0	0.0	0.0
HINTON	12-Aug-91	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
HINTON RAW	12-Aug-91	1.0 U	1.0 U	1.0 U	1.0 U	1.0
HINTON DIFF	12-Aug-91	0.0	0.0	0.0	0.0	0.0
HINTON	12-Jul-93	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
HINTON RAW	12-Jul-93	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
HINTON DIFF	12-Jul-93	0.0	0.0	0.0	0.0	0.0
SLAVE LAKE	14-Feb-91	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
SLAVE LAKE RAW	14-Feb-91	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
SLAVE LAKE DIFF	14-Feb-91	0.0	0.0	0.0	0.0	0.0
SMITH RAW	22-Jun-92	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
SMITH RAW	22-Jun-92	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
SMITH DIFF	22-Jun-92	0.0	0.0	0.0	0.0	0.0
SMITH	19-May-93	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
SMITH RAW	19-May-93	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
SMITH DIFF	19-May-93	0.0	0.0	0.0	0.0	0.0
WHITECOURT	12-Feb-90	5.0	4.0	1.0 U	1.0 U	2.0
WHITECOURT RAW	12-Feb-90	4.0	4.0	1.0 U	1.0 U	1.0 U
WHITECOURT DIFF	12-Feb-90	-1.0	0.0	0.0	0.0	-1.0
WHITECOURT	12-Jun-91	1.0 U	1.0 U	1.0 U	1.0 U	2.0
WHITECOURT RAW	12-Jun-91	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
WHITECOURT DIFF	12-Jun-91	0.0	0.0	0.0	0.0	-1.0
WHITECOURT	25-Feb-92	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
WHITECOURT RAW	25-Feb-92	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
WHITECOURT DIFF	25-Feb-92	0.0	0.0	0.0	0.0	0.0
WHITECOURT	15-Oct-92	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
WHITECOURT RAW	15-Oct-92	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
WHITECOURT DIFF	15-Oct-92	0.0	0.0	0.0	0.0	0.0
WORSLEY	18-May-93	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
WORSLEY RAW	18-May-93	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
WORSLEY DIFF	18-May-93	0.0	0.0	0.0	0.0	0.0