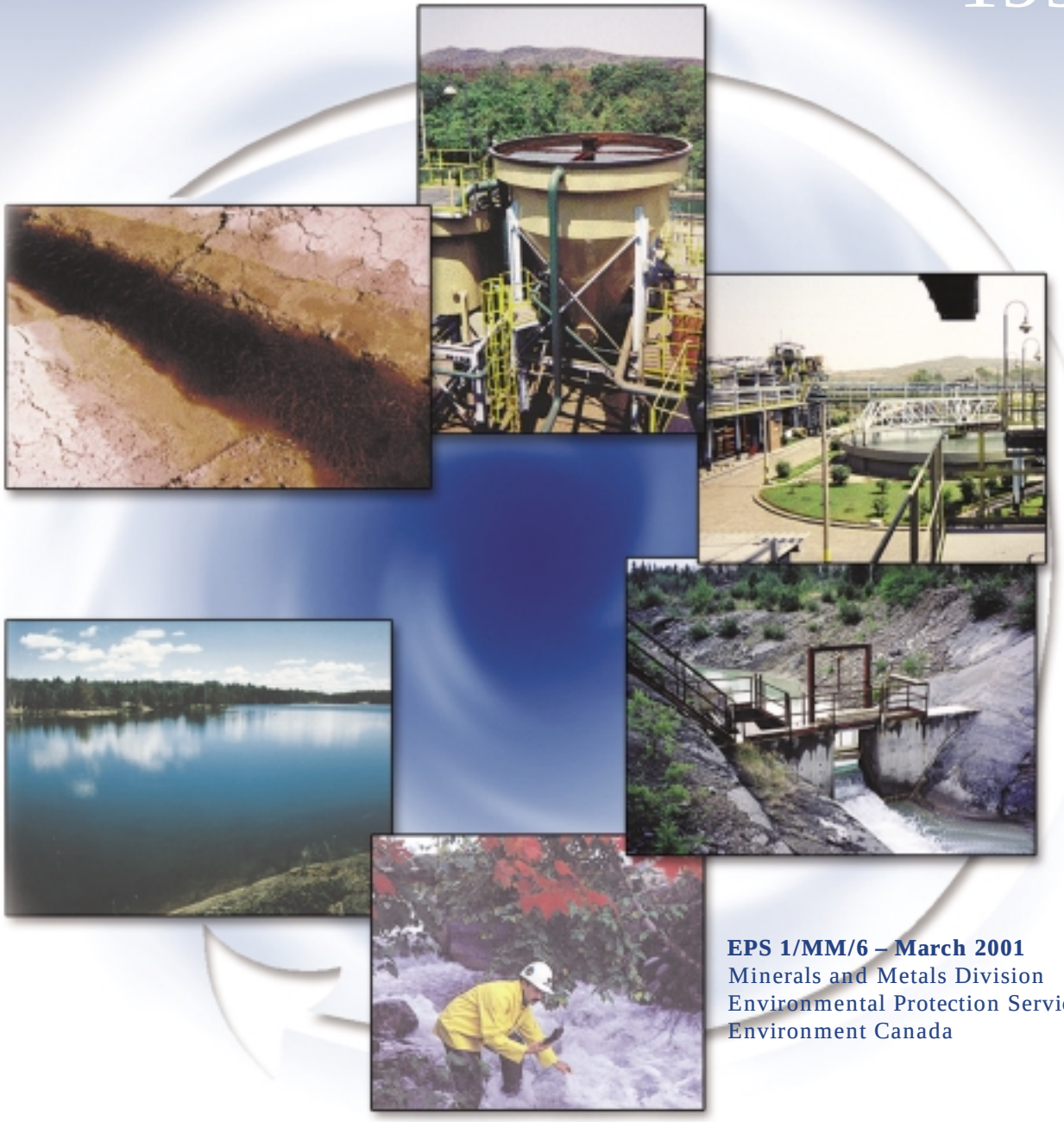
Status Report on
WATER POLLUTION CONTROL
in the Canadian Metal Mining Industry

1998



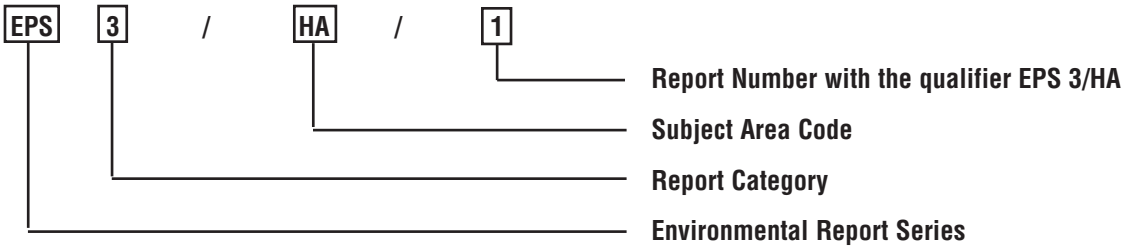
EPS 1/MM/6 – March 2001
Minerals and Metals Division
Environmental Protection Service
Environment Canada

Environment Canada Environnement Canada

Canada

ENVIRONMENTAL PROTECTION SERIES

Sample Number:



Categories

1 Regulations/Guidelines/Codes of Practice
2 Problem Assessment and Control Options
3 Research and Technology
4 Literature Reviews
5 Surveys
6 Social, Economic and Environmental Impact Assessments
7 Surveillance
8 Policy Proposals and Statements
9 Manuals

Subjects

AG Agriculture
AN Anaerobic Technology
AP Airborne Pollutants
AT Aquatic Toxicity
CC Commercial Chemicals
CE Consumers and the Environment
CI Chemical Industries
FA Federal Activities
FP Food Processing
HA Hazardous Wastes
IC Inorganic Chemicals
MA Marine Pollutants
MM Mining and Ore Processing
NR Northern and Rural Regions
PF Paper and Fibres
PG Power Generation
PN Petroleum and Natural Gas
RA Refrigeration and Air Conditioning
RM Reference Methods
SF Surface Finishing
SP Oil and Chemical Spills
SRM Standard Reference Methods
TS Transportation Systems
TX Textiles
UP Urban Pollution
WP Wood Protection/Preservation

New subjects and codes are introduced as they become necessary. A list of EPS reports may be obtained from Environmental Protection Publications, Environmental Protection Service, Environment Canada, Ottawa, Ontario, K1A 0H3, Canada.

© Minister of Public Works and Government Services Canada 2001

Status Report on
WATER POLLUTION CONTROL
in the Canadian Metal Mining Industry

1998

EPS 1/MM/6 – March 2001
Minerals and Metals Division
Environmental Protection Service
Environment Canada

Environment Canada Environnement Canada

Canada

NATIONAL LIBRARY OF CANADA CATALOGUING IN PUBLICATION DATA

Main entry under title:

Status report on water pollution control in the canadian metal mining industry

Quadriennal.
Description based on 1998.
(Report ; EPS 1/MM/6)
Issued also in French under title: Rapport d'étape sur la dépollution de l'eau dans l'industrie canadienne des mines de métaux.

ISBN 0-660-18380-3

Cat. No. En49-24/1-6E

ISSN 1496-4716

1. Mineral industries – Waste disposal – Canada – Periodicals.
2. Mineral industries – Environmental aspects – Canada – Periodicals.
3. Effluent quality – Canada – Evaluation – Periodicals.

I. Canada. Minerals and Metals Division
II. Canada. Environment Canada.
III. Series: Information report (Canada. Environment Canada); EPS 1/MM/6.

TD195.M5S72 2001 363.738'46 C2001-980004-5

READERS' COMMENTS

Comments and inquiries about the content of this report should be addressed to:

Chief
Minerals and Metals Division
Environmental Protection Service
Environment Canada
Ottawa, Ontario
K1A 0H3

Additional copies of this report are available from:

Environmental Protection Publications
Environmental Technology Advancement Directorate
Environment Canada
Ottawa, Ontario
K1A 0H3

REVIEW NOTICE

This report has been reviewed by officials of the Minerals and Metals Division, Environment Canada, and approved for publication. Approval does not necessarily signify that the contents reflect the views and policies of Environment Canada. Mention of trade names or commercial products does not constitute recommendation or endorsement for use.

This document does not purport to address all of the safety aspects associated with its use. Anyone using this document has the responsibility to consult the appropriate authorities and to establish health and safety practices in conjunction with any regulatory requirements prior to its use.

The data used in this report were obtained principally through cooperative arrangements between the federal and provincial environment agencies. The data were consolidated from several sources by Environment Canada staff and are based on samples collected and analyzed by mining companies and reported to provincial, territorial and federal agencies.

ABSTRACT

This report summarizes the performance of Canadian metal mines with respect to selected standards prescribed by the *Metal Mining Liquid Effluent Regulations* (MMLER) and the associated Metal Mining Liquid Effluent Guidelines (MMLEG) in 1998. This is the fifth in a series of reports that have been published by Environment Canada on a four-year cycle since 1982.

More information on the *Metal Mining Liquid Effluent Regulations* and related guidance documents is available on Environment Canada's Green Lane at www.ec.gc.ca/nopp/metals/english/index.cfm.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

SUMMARY

This report summarizes the performance of Canadian metal mines with respect to the *Metal Mining Liquid Effluent Regulations* (MMLER) and the associated Metal Mining Liquid Effluent Guidelines (MMLEG) in 1998. This is the fifth in a series of reports that have been published by Environment Canada on a four-year cycle since 1982.

The report is based on an analysis of monitoring data reported by mine operators to federal, provincial and territorial regulatory authorities. For the purposes of this report, performance was based on an analysis of monthly effluent quality data. Mines subject to the regulations were considered to meet the Monthly Effluent Quality Standards (MEQS) for a given month if all effluent discharges complied with the maximum authorized monthly mean concentrations for that month. Similarly, mines subject to the guidelines were considered to meet the MEQS for a given month if all effluent discharges conformed with the monthly mean concentration objectives for that month. Performance for the year was based on the percentage of operational months that a mine met the MEQS.

In 1998, a total of 67 metal mines operating in all provinces and territories except Alberta, Nova Scotia and Prince Edward Island were subject to the MMLER and associated guidelines.

Of the 32 metal mines that were subject to the regulations, 24 achieved 100% compliance with the MEQS. The overall rate of compliance with the MEQS was 97.3% for regulated mines.

Of the 35 metal mines that were subject to the guidelines, 19 achieved the MEQS. The overall rate of achievement of the MEQS was 92.3% for guideline mines.

This report identifies the mines that did not achieve full compliance or conformance with the MEQS in 1998. The major causes of underperformance were elevated concentrations of zinc and total suspended matter.

SOMMAIRE

Le présent rapport résume la performance en 1998 des mines canadiennes de métaux à l'égard du *Règlement sur les effluents liquides des mines de métaux* (RELMM) et du document qui l'accompagne, les Lignes directrices concernant les effluents liquides des mines de métaux (LDELMM). Il s'agit du cinquième rapport de ce genre publié par Environnement Canada tous les quatre ans depuis 1982.

Le rapport est fondé sur l'analyse des données de contrôle communiquées par les exploitants de mines aux organismes fédéraux, provinciaux et territoriaux de réglementation. Aux fins du présent document, la performance a été évaluée en fonction de l'analyse des données mensuelles sur la qualité des effluents. On a jugé que les mines assujetties au Règlement étaient conformes aux normes mensuelles de qualité des effluents (NMQE) pour un mois donné si tous les rejets d'effluents ne dépassaient pas la moyenne mensuelle des concentrations maximales autorisées pour ce mois. De même, on a jugé que les mines assujetties aux Lignes directrices satisfaisaient aux NMQE pour un mois donné si tous les rejets d'effluents rencontraient les objectifs relatifs aux concentrations moyennes mensuelles pour ce mois. La performance annuelle a été fondée sur le pourcentage de mois d'exploitation pendant lesquels une mine a satisfait aux NMQE.

En 1998, 67 mines de métaux exploitées dans les provinces et les territoires, à l'exception de l'Alberta, de la Nouvelle-Écosse et de l'Île-du-Prince-Édouard, étaient assujetties au RELMM et aux lignes directrices afférentes.

Des 32 mines de métaux assujetties au Règlement, 24 se sont conformées aux NMQE dans une proportion de 100 %. Le pourcentage global de conformité aux NMQE a été de 97,3 %.

Des 35 mines de métaux assujetties aux Lignes directrices, 19 ont satisfait aux NMQE. Le pourcentage global de satisfaction aux NMQE a été de 92,3 %.

Le présent rapport fait état des mines qui ne se sont pas conformées ou qui n'ont pas satisfait aux NMQE en 1998. Les principales causes de cette contre-performance ont été les concentrations élevées de zinc et de matières totales en suspension.

1.0 INTRODUCTION

This report summarizes the performance of Canadian metal mines with respect to the *Metal Mining Liquid Effluent Regulations* (MMLER) and the associated Metal Mining Liquid Effluent Guidelines (MMLEG) in 1998. This is the fifth in a series of reports that have been published by Environment Canada on a four-year cycle since 1982.

The *Fisheries Act* provides the primary legislative authority for federal water pollution control programs. Subsection 36(3) of the *Fisheries Act* prohibits the deposit of deleterious substances into waters frequented by fish, unless authorized by regulations. The MMLER were passed in February 1977 under the *Fisheries Act*. The regulations apply to new, expanded and reopened metal mines but not to gold mines using the cyanidation process as defined in the regulations. Guidelines were published at the same time to establish effluent quality objectives for all other metal mines that were in operation prior to the promulgation of the MMLER.

Environment Canada administers and monitors compliance with the MMLER and achievement of the MMLEG. The regulatory requirements are typically implemented through licences or permits issued by provinces or federal agencies, but in some cases there may be direct regulatory involvement by Environment Canada. Cooperative arrangements with other government agencies are important elements in Environment Canada's pollution prevention control programs. Inspections are also conducted by staff of Environment Canada in all regions.

An overview of the MMLER and the MMLEG and their current application to Canadian metal mines is presented in Section 2.

The status of individual mines in meeting the monthly effluent quality standards of the regulations and guidelines in 1998 is reviewed in Section 3.

In addition to its regulatory role, Environment Canada promotes the advancement of technology to effectively manage industrial effluents. The principal technologies used to treat effluents from metal mines and mills are briefly described in Section 4.

2.0 METAL MINING LIQUID EFFLUENT REGULATIONS (MMLER) AND GUIDELINES (MMLEG)

The MMLER, the MMLEG, an Environmental Code of Practice for Mines and Explanatory Notes were published by Environment Canada in 1977 in a single report entitled *Metal Mining Liquid Effluent Regulations and Guidelines* (EPS 1-WP-77-1). The legal reference to the regulations is (the) *Consolidated Regulations of Canada 1978*, Chapter 819 (Government of Canada, 1978).

The MMLER prescribe authorized concentration limits for deleterious substances in mine effluents that are discharged to waters frequented by fish. The limits are based on "best practicable technology" as determined by a state-of-the-art review by a joint federal-provincial-industry task force. The regulated parameters are arsenic, copper, lead, nickel, zinc, total suspended matter, radium-226 and pH. The regulations apply to new, expanded and reopened metal mines but do not apply to gold mines using the cyanidation process (as defined in the MMLER).

In response to a commitment to "update and strengthen" the MMLER in the Government of Canada's 1990 environmental policy, Environment Canada held a multi-stakeholder consultative workshop in November 1992 to identify issues that should be addressed. One of the workshop's recommendations was to assess the known aquatic effects of mining in Canada through what was subsequently identified as the "AQUAMIN" process.

The AQUAMIN process was initiated in 1993 to determine the effectiveness of the MMLER by assessing existing information on aquatic effects in Canada and to make recommendations on:

(i) amendments to the MMLER and the federal regulatory framework;

(ii) the design of an Environmental Effects Monitoring program for mining to identify effects in the aquatic environment; and

(iii) information gaps requiring further research.

The AQUAMIN process was carried out by a multi-stakeholder group that included representatives from the federal government, provinces, industry, and environmental and Aboriginal organizations. The process reviewed existing (post-1985) site-specific data and reports on the effects of mine effluents on the receiving environment to assess the efficacy of the MMLER in protecting the aquatic environment. The key recommendations of the April 1996 final report of AQUAMIN were as follows:

(i) to revise the MMLER to ensure a consistent national effluent quality requirement at Canadian mines;

(ii) to set site-specific requirements where necessary to protect local receiving environments; and

(iii) to require environmental effects monitoring programs to provide reporting and feedback on the effectiveness of protection measures.

2.1 Application of the MMLER

The authorized levels of deleterious substances prescribed by the MMLER are shown in Table 1, and the authorized levels of pH are shown in Table 2.

In these regulations, a mine is defined as including "all metal mining and milling facilities that are used to produce a metal concentrate or an ore from which a metal or metal concentrate may be produced and associated smelters, pelletizing plants, sinter plants, refineries, acid plants and any similar operations where the effluent from such operations are combined with effluents from mining and milling". The regulations apply to new, expanded and reopened mines but do not apply to existing mines that were in commercial production for at least two months in the twelve months immediately prior to February 25, 1977. A new mine is one that commenced commercial production on or after that date. An expanded mine is a mine that increased its production rate by more than 30% over the reference production rate after February 25, 1977. A reopened mine is one that resumed production on or after that date and is not an existing mine. A gold mine is defined as one where the gold is recovered in the operation area by the process of cyanidation and accounts for more than 50% of the value of the output of the mine.

The release of deleterious substances in effluents from metal mines is related to, among other factors, the natural characteristics of the ore and uncontrollable water flows into the mine, waste rock dumps, or tailings pond. Consequently, there is no direct relationship between the production rate of a mine and the amount of deleterious substances that may be released. Tailings or waste rock at inactive sites may also continue to release substantial amounts of deleterious substances. Therefore, the limits in the MMLER and MMLEG are based on the concentrations of deleterious substances in the effluent rather than on the production rate of the mine.

Table 1 Authorized Levels of Deleterious Substances Prescribed in the MMLER

Substance	Maximum Authorized Monthly Arithmetic Mean Concentration	Maximum Authorized Concentration in a Composite Sample	Maximum Authorized Concentration in a Grab Sample
Arsenic	0.5 mg/L	0.75 mg/L	1.0 mg/L
Copper	0.3 mg/L	0.45 mg/L	0.6 mg/L
Lead	0.2 mg/L	0.3 mg/L	0.4 mg/L
Nickel	0.5 mg/L	0.75 mg/L	1.0 mg/L
Zinc	0.5 mg/L	0.75 mg/L	1.0 mg/L
Total Suspended Matter	25.0 mg/L	37.5 mg/L	50.0 mg/L
Radium-226	10.0 pCi/L	20.0 pCi/L	30.0 pCi/L

Note: All concentrations are total values with the exception of radium-226, which is a dissolved value after filtration through a 3-micron filter.

Table 2 Authorized Levels of pH Prescribed in the MMLER

Parameter	Minimum Authorized Monthly Arithmetic Mean pH	Minimum Authorized pH in a Composite Sample	Minimum Authorized pH in a Grab Sample
pH	6.0	5.5	5.0

Note: The concentration and pH objectives in the Metal Mining Liquid Effluent Guidelines have the same numeric values as the authorized levels prescribed in the MMLER.

2.2 Application of the MMLEG

The MMLEG apply to all metal mines, other than gold mines using cyanidation, that were operating prior to February 1977. The concentration and pH objectives in the MMLEG have the same numeric values as the authorized levels prescribed in the MMLER. Effluent quality objectives in the MMLEG are not legally enforceable. However, all mines are subject to the provisions of Subsection 36(3) of the *Fisheries Act*. In addition, a mine may be legally obligated to meet the guidelines if a federal, provincial or territorial government agency imposes these limits in a permit or licence issued under other legislation.

Environment Canada also developed methods for the measurement of acute lethality in effluents from metal mines. These specify a bioassay test procedure in which rainbow trout are exposed to undiluted effluent for 96 hours (Environment Canada, *Biological Test Method: Reference method for Determining Acute Lethality of Effluents to Rainbow Trout* (EPS 1/RM/13, July 1990, as amended in May 1996). If 50% of the fish survive, the effluent is considered to pass the test. The acute lethality test measures the short-term effect on fish of all substances that may be contained in an effluent.

2.3 The Code of Practice

An Environmental Code of Practice for Mines was also developed and published with the regulations and guidelines (Environment Canada, 1977). The Code of Practice makes recommendations related to the design and operation of effluent treatment facilities at mining and milling operations. The Code also identifies pollution control practices that are recommended by Environment Canada.

2.4 Implementation of the MMLER and MMLEG

Environment Canada and Fisheries and Oceans Canada cooperate with provincial and territorial governments and other federal agencies in implementing the MMLER and MMLEG. The federal government has generally implemented the requirements of the regulations and guidelines through agreements with provincial or territorial authorities to include the federal effluent limits in licences or permits issued to a mining company. While this one-window approach is preferred, Environment Canada may deal directly with mines in cases where regulated or guideline limits have been exceeded.

Since uranium mines are licensed under the *Canadian Nuclear Safety and Control Act*, Environment Canada works closely with the Canadian Nuclear Safety Commission to implement the regulations and guidelines for uranium mines through licences issued by the Commission.

In the Yukon and the Northwest Territories, Environment Canada works closely with the territorial water boards and Indian and Northern Affairs Canada in the licensing of mines.

2.5 Monitoring and Reporting Requirements

Monitoring and reporting requirements are specified in sections 6 through 10 of the MMLER. Modifications to the monitoring and reporting scheme are covered in Section 11 of the regulations.

The frequency with which effluents are to be sampled and analyzed for prescribed parameters is defined in Schedule 2 of the MMLER. Mining operations are required to monitor effluents and to report results on a regular basis. The reporting arrangements vary with each province and territory. Generally, regulated mines are required to report results directly to Environment Canada, while guideline mines may report directly to Environment Canada or through another agency.

Similar arrangements exist between Environment Canada and other federal agencies and have been formalized through various memorandums of understanding.

2.6 Designation of Tailings Impoundment Areas

A proposed tailings impoundment area encompasses a small pond or lake that may be frequented by fish. If the fish are not a significant stock, the Minister of Fisheries and Oceans may designate this area as a tailings impoundment area under Subsection 5(2) of the MMLER. Since the regulations came into effect in 1977, four tailings impoundment areas have been designated. Any other alteration of fish habitat resulting from the development of a mine requires approval by Fisheries and Oceans Canada under Subsection 35(2) of the *Fisheries Act* and Section 58 of the 1993 Fisheries (Canada) Regulations.

2.7 Gold Mines

Gold-mining operations using cyanidation are not subject to either the MMLER or the MMLEG, as suitable technology to treat cyanide effluents had not been demonstrated when the regulations and guidelines were promulgated in 1977.

Gold-mining operations that do not use cyanidation as defined by the MMLER are subject to the regulations and guidelines in accordance with the same criteria applied to other metal mines. A number of gold mines were developed or reopened in the 1980s and 1990s that provide ore or mineral concentrates for further processing by a mill or smelter at a different site. If these mines meet the definition of a “gold mine” in the MMLER, they are exempt from the regulations.

Over the course of the past 15 years, several effective cyanide removal technologies have been developed and implemented in Canada to treat cyanide-bearing effluents. These technologies include natural degradation, alkaline chlorination, the INCO SO_2/air process, hydrogen peroxide oxidation, the Hemlo Gold process and the cyanide recovery process. On this basis, the AQUAMIN report recommended that gold mines using cyanide be subject to the updated and strengthened MMLER.

3.0 PERFORMANCE DATA

3.1 Data Collection

The data used in this report were obtained through cooperative arrangements between federal and provincial agencies. The data were consolidated from several sources. However, the primary source was information submitted to federal, provincial and territorial regulatory authorities by mine operators. Closed mines and inactive tailings impoundment sites are not subject to the MMLER or MMLEG and are not addressed in this report.

3.2 Data Analysis

For the purposes of this report, performance was based on an analysis of monthly effluent quality data. Mines subject to the regulations were considered to meet the monthly effluent quality standards (MEQS) for a given month if all effluent discharges complied with the maximum authorized monthly mean concentrations for that month. Similarly, mines subject to the guidelines were considered to meet the MEQS for a given month if all effluent discharges achieved the monthly mean concentration objectives for that month. Performance for the year was based on the percentage of operational months that a mine met the MEQS.

3.3 National Summary

In 1998, a total of 67 metal mines operating in all provinces and territories except Alberta, Nova Scotia and Prince Edward Island were subject to the MMLER and the MMLEG.

Of the 32 metal mines that were subject to the MMLER, 24 achieved 100% compliance with the MEQS. The overall rate of compliance with the MEQS was 97.3% for regulated mines. The regional distribution of performance by regulated mines is illustrated in Figure 1, and performance by individual mines is summarized in Table 3. Of the eight specified parameters, the limits most often exceeded were those for zinc and total suspended matter (TSM).

Of the 35 metal mines that were subject to the MMLEG, 19 achieved the MEQS. The overall rate of achievement of the MEQS was 92.3% for guideline mines. The regional distribution of performance by guideline mines is illustrated in Figure 2, and performance by these mines is summarized in Table 4.

Figure 1
Comparison of Regional Performance of Regulated Mines in 1998

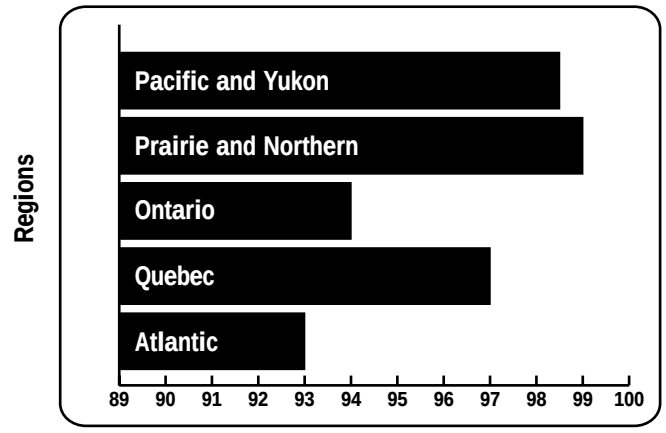


Figure 2
Comparison of Regional Performance of Guideline Mines in 1998

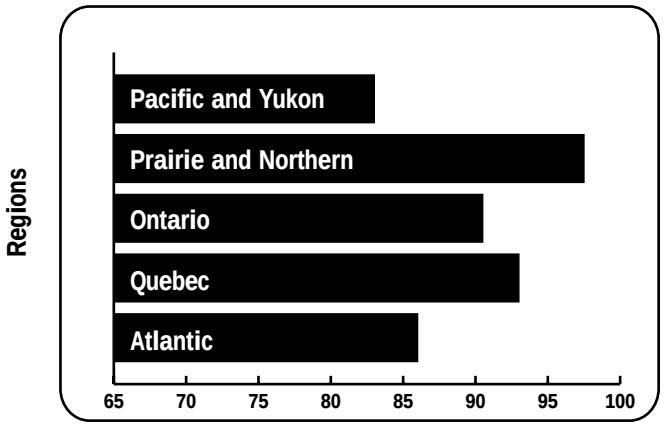


Table 3 Summary of Performance by Mines Subject to the MMLER in 1998

Mine Name (Company), Province	% Compliance with MEQS in 1998	Comments
1. Craigmont (Craigmont), British Columbia	100	No surface effluent
2. Eskay Creek (Princeton), British Columbia	100	
3. Huckleberry (Princeton), British Columbia	91.7 Did not comply with MEQS for TSM for 1 month	
4. Highland Valley Copper (Cominco), British Columbia	100	
5. Myra Falls (Boliden Westmin), British Columbia	100	
6. Snip (Prime Resources), British Columbia	100	
7. Polaris (Cominco), Northwest Territories	100	Discharged effluent, July-August
8. Rabbit Lake (Cameco), Saskatchewan	100	Precipitation pond discharge is subject to regulations
9. Cluff Lake (Cogema), Saskatchewan	100	
10. Key Lake (Cameco), Saskatchewan	100	
11. Keystone (Black Hawk), Manitoba	100	Mine opened in 1993
12. Photo Lake (Hudson Bay Mining and Smelting), Manitoba	100	Mine opened in 1995
13. Trout Lake (Hudson Bay Mining and Smelting), Manitoba	91.7 Did not comply with MEQS for TSM for 1 month	
14. Hoyle Pond (Kinross Gold), Ontario	100	No surface effluent
15. Lindsley (Falconbridge), Ontario	100	No surface effluent
16. Whistle (INCO), Ontario	91.7 Did not comply with MEQS for Ni for 1 month	
17. Winston Lake (Inmet), Ontario	83.3 Did not comply with MEQS for Ni for 2 months	
18. Bousquet (Barrick), Quebec	100	
19. Bouchard-Hébert (Cambior), Quebec	100	Mine opened in 1995
20. Francoeur (Richmont), Quebec	100	
21. Gonzague Langlois (Cambior), Quebec	100	Mine opened in 1996
22. Joe Mann (Campbell Resources), Quebec	100	
23. Joubi (Western Quebec), Quebec	100	
24. Katinniq-Raglan (Raglan), Quebec	100	Mine opened in 1997
25. Louvicourt (Novicourt), Quebec	100	
26. Mouska (Cambior), Quebec	100	
27. Niobec (Cambior), Quebec	91.7 Did not comply with MEQS for TSM for 1 month	
28. Selbaie Mine (Gencor), Quebec	91.7 Did not comply with MEQS for Zn for 1 month	
29. Sigma 2 (McWatters), Quebec	100	
30. Troilus (Inmet), Quebec	83.3 Did not comply with MEQS for TSM for 2 months	Mine opened in 1997
31. Caribou (CanZinco), New Brunswick	85.7 Did not comply with MEQS for Pb for 1 month	Mine closed August 1998
32. Restigouche (CanZinco), New Brunswick	100	Mine closed August 1998

Note: Mines are listed in a general west to east order.

Table 4 Summary of Performance by Mines Subject to the MMLEG in 1998

Mine Name (Company), Province	% Achievement of MEQS in 1998	Comments
1. Endako (Thompson Creek), British Columbia	Not assessed	Data not available, mine is closed
2. Gibraltar (Westmin), British Columbia	Not assessed	Data not available, mine is closed
3. Sullivan (Cominco), British Columbia	83.3 Did not achieve MEQS for Zn for 2 months	
4. Nanisivik (CanZinco), Northwest Territories	100	
5. Flin Flon Mill (Hudson Bay Mining and Smelting), Manitoba	100	
6. Thompson Mill (INCO), Manitoba	100	
7. Thompson Complex & Birchtree (INCO), Manitoba	100	
8. Birchtree (INCO), Manitoba	100	
9. Ruttan (Hudson Bay Mining and Smelting), Manitoba	100	
10. Bernic Lake (Cabot Corporation), Manitoba	83.3 Did not achieve MEQS for TSM for 2 months	Non-achievement in February due to early thaw and ice jam; steps taken
11. Copper Cliff WWTP (INCO), Ontario	100	
12. Nolin Creek WWTP (INCO), Ontario	83.3 Did not achieve MEQS for Ni for 2 months	
13. Crean Hill (INCO), Ontario	91.7 Did not achieve MEQS for Ni for 1 month	
14. Garson (INCO), Ontario	83.3 Did not achieve MEQS for Ni for 2 months	
15. Strathcona Mill (Falconbridge), Ontario	100	
16. Lockerby (Falconbridge), Ontario	91.7 Did not achieve MEQS for Ni for 1 month	
17. Kidd Creek (Falconbridge), Ontario	83.3 Did not achieve MEQS for Zn for 2 months	
18. Algoma Ore Division (Algoma Steel), Ontario	91.7 Did not achieve MEQS for TSM for 1 month	
19. Gaspé (Noranda), Quebec	100	
20. Horne (Noranda), Quebec	91.7 Did not achieve MEQS for Zn for 1 month	
21. Lac Matagami (Noranda), Quebec	100	
22. Lac Tio (QIT), Quebec	91.7 Did not achieve MEQS for TSM for 1 month	
23. Mount-Wright (Québec Cartier), Quebec	91.7 Did not achieve MEQS for TSM for 1 month	
24. Principale (Campbell Resources), Quebec	83.3 Did not achieve MEQS for Cu for 2 months	
25. Brunswick #12 (Noranda), New Brunswick	100	
26. Heath Steele (Noranda), New Brunswick	100	
27. Iron Ore Company of Canada (Iron Ore Company of Canada), Newfoundland	Not assessed	Data not available
28. Wabush (Stelco), Newfoundland	58.3 Did not achieve MEQS for TSM for 1 month and pH for 4 months	pH exceedances possibly due to laboratory procedure

3.4 Data for Individual Mines

All mines that were subject to the MMLER and MMLEG in 1998 are listed in Tables 5 to 12.

The name of each mine, the name of the company, and the approximate location are listed in Column 1 of the tables. Company names have been abbreviated by omitting such words as “Mine”, “Corporation”, “Limited”, etc. Parent or managing company names are also given. The full name of each mining company is provided in Appendix A.

Column 2 indicates:

(a) the metals produced (by-products in brackets);

(b) the rated capacity of the mill in metric tonnes of ore per day (tpd), or in the case of mines that ship ore to a mill at another location, the average amount of ore produced by the mine; and

(c) the method of mining (underground or open pit).

Effluent treatment facilities are described in Column 3, and the discharge point is identified in Column 4. Data for average annual quality of effluents (or typical data where limited data are available) are provided in Column 5.

The effluent from a mining operation does not necessarily contain measurable concentrations of all of the prescribed deleterious substances. Metals commonly occur in ore as insoluble minerals. In the absence of acid mine water, low total concentrations of metals would be expected to occur in the effluent. To simplify the data, metal concentrations of less than 0.01 milligrams per litre (mg/L) are not reported in the tables.

As the frequency of monitoring varies considerably from mine to mine, the data in Column 5 provide only a general view of the effluent quality. In some cases the figures in Column 5 represent the average of monthly data, while in other cases they represent the average of a limited number of samples. The comments in Column 6 indicate if the mine is subject to the regulations or to the associated guidelines and summarize its performance with regard to the MEQS in 1998. These comments are based on an examination of all data available to Environment Canada and not on the annual average shown in Column 5. For example, although the average annual concentration of zinc in a particular effluent might be 0.4 mg/L, effluent may have exceeded the maximum authorized monthly mean concentration of 0.5 mg/L in some months.

3.5 Summary of Performance by Region

3.5.1 Pacific and Yukon Region

In 1998, nine base metal mines were operating in the Pacific and Yukon Region, all of which were located in British Columbia. Six of these mines were subject to the MMLER, and one of them did not achieve 100% compliance with the MEQS (see Figure 3). Three mines were subject to the MMLEG. The performance of the Endako Mine and the Gibraltar Mine was not assessed because they are now closed and data were not available. The third mine subject to the guidelines did not achieve 100% of the MEQS.

There were no operating metal mines in the Yukon in 1998.

3.5.2 Prairie and Northern Region

This region encompasses the provinces of Alberta, Saskatchewan and Manitoba, as well as the Northwest Territories and Nunavut. In 1998, 13 mines were operating in this region: 10 base metal mines and three uranium mines. Of these mines, two were in the Northwest Territories, three in Saskatchewan and eight in Manitoba.

Seven mines were subject to the MMLER, and one of these did not achieve 100% compliance with the MEQS (see Figure 4).

Six mines were subject to the MMLEG, and one of these did not achieve 100% of the MEQS (see Figure 5).

3.5.3 Ontario Region

In 1998, there were 18 base metal mines, one iron ore mine and one gold mine not using the cyanidation process operating in the Ontario Region. In addition, various effluents were treated in two wastewater treatment plants at the INCO complex in Sudbury.

Four mines were subject to the MMLER, and two of these did not achieve 100% of the MEQS (see Figure 6).

Sixteen mines were subject to the MMLEG, and six of these did not achieve 100% of the MEQS (see Figure 7).

3.5.4 Quebec Region

In 1998, there were nine base metal mines, eight gold mines not using cyanidation and two iron ore mines operating in the Quebec Region.

Thirteen mines were subject to the MMLER, and three of these did not achieve 100% of the MEQS (see Figure 8).

Six mines were subject to the MMLEG, and four of these did not achieve 100% of the MEQS (see Figure 9).

3.5.5 Atlantic Region

This region includes the provinces of New Brunswick, Nova Scotia, Prince Edward Island and Newfoundland. In 1998, four base metal mines were operating in New Brunswick, and two iron ore mines were operating in Newfoundland.

Two mines were subject to the MMLER, and one of them did not achieve 100% compliance with the MEQS (see Figure 10).

Four mines were subject to the MMLEG, and two of these achieved 100% of the MEQS (see Figure 11). Two iron ore mines practised unconfined tailings disposal into sections of lakes.

Table 5 Treatment Facilities and Effluent Quality for Metal Mines in British Columbia in 1998

Mine Name (Company), Location	Products (By-products), Rated Milling Capacity, Mining Method	Treatment Facility	Discharge Point	Annual Average Quality of Effluent in 1998							Comments
				Metals and TSM in mg/L							
				As	Cu	Ni	Pb	Zn	TSM	pH	
1. Craigmont, (Craigmont) Merritt	Magnetite	Treatment water recycled		No surface effluent							
2. Endako , (Thompson Creek) Endako	Molybdenum, 30,000 tpd, open pit	Tailings pond with partial recycle; seepage collection ponds		Data not available							Performance not assessed
3. Eskay Creek (Princeton), Stewart	Gold, silver, 300 tpd, underground	Settling ponds; ferric chloride addition for control of antimony in mine drainage	D3	<0.01	<0.01	0.01	<0.01	0.04	5.2	7.6	
			D7	<0.01	<0.01	0.05	<0.01	0.03	18.6	7.8	Complied with all MEQS during 1998
			W20	0.01	<0.01	<0.01	0.02	0.02	5.2	7.8	Complied with all MEQS during 1998
4. Gibraltar (Westmin), McLeese Lake	Copper, 38,000 tpd, open pit	Tailings pond with recycle		Data not available							Performance not assessed
5. Highland Valley (Cominco), Logan Lake	Copper-molybdenum 140,000 tpd, open pit	Tailings pond with recycle	Bose Lake	-	0.04	-	-	0.01	-	6.9	
			Pukaiat Creek	-	<0.01	-	-	<0.01	1.6	8.2	
			Trojan Creek	-	0.01	-	-	<0.01	2.9	8.3	
			Witches Brook	-	<0.01	-	-	<0.01	3.2	7.5	

Table 5 Treatment Facilities and Effluent Quality for Metal Mines in British Columbia in 1998 (cont'd)

Mine Name (Company), Location	Products (By-products), Rated Milling Capacity, Mining Method	Treatment Facility	Discharge Point	Annual Average Quality of Effluent in 1998							Comments
				Metals and TSM in mg/L							
				As	Cu	Ni	Pb	Zn	TSM	pH	
6. Huckleberry (Princeton), Houston	Copper (silver, gold), 18,000 tpd, open pit	Treatment water recycled	SC-2	<0.01	<0.01	-	<0.01	<0.01	4.4	7.3	
			SC-2 Seep	-	<0.01	-	<0.01	0.01	2.5	7.1	
			SC-3	<0.01	<0.01	-	<0.01	<0.01	5.0	7.4	
			SC-4	<0.01	<0.01	-	<0.01	<0.01	3.7	7.4	
			SC-4 Seep	<0.01	<0.01	<0.01	<0.01	<0.01	2.3	7.1	Complied with all MEQS during 1998
			East Zone Ditch	-	-	-	-	-	11.1	7.1	Above MEQS for TSM for 1 month
7. Myra Falls (Boliden Westmin), Campbell River	Copper, lead, zinc (silver, gold), 4,000 tpd, underground	Tailings pond with groundwater collection; acid drainage treatment plant	Myra Pond	-	0.04	-	<0.01	0.08	6.7	10.5	
8. Snip (Prime Resources), Stewart	Gold, 450 tpd, underground	Tailings pond	Sky Creek	0.04	<0.01	<0.01	0.01	0.02	4.2	7.9	
9. Sullivan (Cominco), Kimberley	Lead, zinc (silver), 5,200 tpd, underground	Tailings pond, settling pond, acid mine drainage treatment plant	Kootenay	<0.01	0.01	<0.01	0.03	0.28	9.3	9.2	Above MEQS for Zn for 2 months

Table 6 Treatment Facilities and Effluent Quality for Metal Mines in the Northwest Territories in 1998

Mine Name (Company), Location	Products (By-products), Rated Milling Capacity, Mining Method	Treatment Facility	Discharge Point	Annual Average Quality of Effluent in 1998							Comments
				Metals and TSM in mg/L							
				As	Cu	Ni	Pb	Zn	TSM	pH	
1. Nanisivik (Breakwater), Nanisivik	Lead, zinc, 2,000 tpd, underground	Tailings pond with partial recycle and lime addition	Pond 159-4	<0.01	<0.01	<0.01	<0.01	0.10	12.8	7.2	Achieved all MEQS during 1998; discharged in June, July and September
2. Polaris (Cominco), Little Cornwallis Island	Lead, zinc, 2,850 tpd, underground	Effluent is limed and thickened	Sample Station 262-7	<0.01	<0.01	<0.01	0.01	0.17	2.2	8.0	Complied with all MEQS during 1998; discharged in July and August

Table 7 Treatment Facilities and Effluent Quality for Metal Mines in Saskatchewan in 1998

Mine Name (Company), Location	Products (By-products), Rated Milling Capacity, Mining Method	Treatment Facility	Discharge Point	Annual Average Quality of Effluent in 1998							Comments
				Metals and TSM in mg/L							
				As	Cu	Ni	Pb	Zn	TSM	pH	
1. Cluff Lake (Cogema), Cluff Lake	Uranium, 900 tpd, underground and open pit	Settling, decanting, barium chloride addition, flocculant, settling, sand filters	Treated Effluent	<0.01	<0.01	0.01	<0.01	<0.01	3.4	7.2	Ra-226 - 0.30 pCi/L Complied with all MEQS during 1998
2. Key Lake (Cameco), Key Lake	Uranium, 800 tpd, open pit	Ammonia removal, neutralization, barium chloride addition, flocculant, settling	Treated Mill Effluent	0.07	<0.01	0.07	0.01	0.01	1.5	6.4	Ra-226 - 2.61 pCi/L Complied with all MEQS during 1998
3. Rabbit Lake (Cameco), Rabbit Lake	Uranium, 2,000 tpd, open pit	Settling, decanting, barium chloride addition, flocculant, settling	Treated Mill Effluent, Station 2.3.3	0.12	0.01	0.07	<0.01	<0.01	3.14	7.1	Ra-226 - 0.22 pCi/L Complied with all MEQS during 1998

Table 8 Treatment Facilities and Effluent Quality for Metal Mines in Manitoba in 1998

Mine Name (Company), Location	Products (By-products), Rated Milling Capacity, Mining Method	Treatment Facility	Discharge Point	Annual Average Quality of Effluent in 1998							Comments
				Metals and TSM in mg/L							
				As	Cu	Ni	Pb	Zn	TSM	pH	
1. Flin Flon Mill (Hudson Bay Mining and Smelting [HBMS]), Flin Flon	Copper, zinc (gold, silver), 7,700 tpd mill	Tailings pond with lime addition	Tailings Pond North Weir	<0.01	0.01	0.01	0.04	0.26	6.0	10.2	Achieved all MEQS during 1998
HBMS mines providing ore to Flin Flon mill											
a. Flin Flon Mine	Underground	Effluent to mill tailings pond above		-	-	-	-	-	-	-	
b. Trout Lake Mine	Underground	Underground sump, settling in Gil Lake; mechanical effluent treatment plant	Treatment Plant Discharge	<0.01	0.01	0.01	0.04	0.05	21.7	9.7	Above MEQS for TSM for 1 month
2. Keystone (Black Hawk), Farley Lake	Gold, 1,200 tpd, open pit	Surface settling ponds	Sedimentation Pond #1	<0.01	<0.01	<0.01	<0.01	<0.01	3.2	7.3	Complied with all MEQS during 1998
			Sedimentation Pond #2	<0.01	<0.01	<0.01	<0.01	<0.01	1.0	7.9	Complied with all MEQS during 1998

Table 8 Treatment Facilities and Effluent Quality for Metal Mines in Manitoba in 1998 (cont'd)

Mine Name (Company), Location	Products (By-products), Rated Milling Capacity, Mining Method	Treatment Facility	Discharge Point	Annual Average Quality of Effluent in 1998							Comments
				Metals and TSM in mg/L							
				As	Cu	Ni	Pb	Zn	TSM	pH	
3. Photo Lake (HBMS), Snow Lake	Copper, zinc (gold, silver), 1,200 tpd, underground	Mine underwater tailings disposal with partial effluent recycle	End of Pipe Discharge	<0.01	0.02	0.01	0.04	0.3	8.0	7.7	Complied with all MEQS during 1998
4. Ruttan Mine (HBMS), Leaf Rapids	Copper, zinc, 9,000 tpd, underground	Tailings pond with lime addition, partial recycle	Brehaut Lake Outfall	<0.01	0.01	0.01	0.04	0.21	6.9	7.4	Achieved all MEQS during 1998
5. Bernic Lake (Cabot), Lac du Bonnet	Tantalum, 900 tpd, underground	Tailings pond with lime and flocculant additions	Tailings Pond Discharge	0.01	<0.01	0.01	<0.01	0.01	19.4	7.8	Above MEQs for TSM for 2 months
6. Thompson Mill (INCO), Thompson	Nickel, copper (gold, silver, cobalt), 18,000 tpd	Mine and mill water to tailings pond (Misery Lake outflow)	Tailings Pond Discharged to Misery Lake	-	-	0.26	-	-	3.0	7.7	
INCO mines providing ore to Thompson Mill											
a. Thompson Complex and Birchtree Mine	Underground and open pit	Surface drainage - no treatment; Birchtree mine water into swamp	T3 Culvert	-	-	0.20	-	-	6.0	7.7	
b. Birchtree Mine			Surface Runoff - Swamp Stream LP#1	-	-	0.05	-	-	2.0	8.0	
			Effluent Treatment Plant - LP#2	-	-	0.27	-	-	1.0	7.6	

Table 9 Treatment Facilities and Effluent Quality for Metal Mines in Ontario in 1998

Mine Name (Company), Location	Products (By-products), Rated Milling Capacity, Mining Method	Treatment Facility	Discharge Point	Annual Average Quality of Effluent in 1998							Comments
				Metals and TSM in mg/L							
				As	Cu	Ni	Pb	Zn	TSM	pH	
1. Algoma Ore Div. (Algoma Steel), Wawa	Iron ore sinter, 9,000 tpd, underground	Tailings pond; neutralization of mine water; recycle		<0.01	0.02	0.02	0.03	0.02	10.5	7.7	Above MEQS for TSM for 1 month
2. Falconbridge Complex, Sudbury	Nickel, copper (cobalt, gold, silver, platinum)										
a. Strathcona Mill	8,200 tpd	Tailings pond; Moose Lake treatment system: limestone slurry addition for metal removal		<0.01	0.03	0.06	<0.01	<0.01	0.83	7.2	Achieved all MEQS during 1998

Table 9 Treatment Facilities and Effluent Quality for Metal Mines in Ontario in 1998 (cont'd)

Mine Name (Company), Location	Products (By-products), Rated Milling Capacity, Mining Method	Treatment Facility	Discharge Point	Annual Average Quality of Effluent in 1998							Comments
				Metals and TSM in mg/L							
				As	Cu	Ni	Pb	Zn	TSM	pH	
b. The following mines provide ore for Strathcona Mill:		Mine water treated by lime addition for metal removal	Lockerby	<0.01	0.02	0.23	<0.01	0.01	1.6	7.8	Above MEQS for Ni for 1 month
Strathcona	Underground										
Fraser	Underground										
Onaping	Underground										
Lockerby	Underground										
Thayer Lindsley	Underground										No surface effluent
3. Hoyle Pond (Kinross Gold), Timmins	Gold (no cyanidation) 450 tpd, underground; ore treated at Bell Creek Mill	Mine water directed to Bell Creek Mine tailings area		No surface effluent							
4. INCO Complex, Sudbury	Nickel, copper (cobalt, gold, silver, platinum), all underground	Treatment plant, lime addition, solids removal	Copper Cliff Creek	<0.01	0.05	0.21	0.02	<0.01	3.5	8.2	Achieved all MEQS during 1998. This facility treats effluents from various operations listed below; 90% of effluent is. recycled.
a. Frood-Stobie Mill	16,400 tpd	Tailings pond									
Frood Mine	8,000 tpd										
Stobie Mine	6,300 tpd										
Little Stobie Mine	4,200 tpd										
b. Clarabelle Mill	27,300 tpd	Tailings pond									
Copper Cliff South Mine	5,700 tpd										
Creighton Mine	6,200 tpd										
Garson Mine	3,600 tpd										
McCreedy West Mine	2,500 tpd										
Copper Cliff North Mine	2,900 tpd										
c. Copper Cliff Mill	Treats concentrate from Frood-Stobie and Clarabelle mills	Tailings pond, treatment plant, lime addition, solids removal	Nolin Creek	<0.01	0.06	0.41	0.02	0.01	4.0	7.7	Above MEQS for Ni for 2 months
d. McCreedy West Mine	Nickel, copper (cobalt, silver, gold, platinum), ore shipped to Clarabelle Mill 5,400 tpd	Old tailings area used for mine water treatment by lime addition									

Table 9 Treatment Facilities and Effluent Quality for Metal Mines in Ontario in 1998 (cont'd)

Mine Name (Company), Location	Products (By-products), Rated Milling Capacity, Mining Method	Treatment Facility	Discharge Point	Annual Average Quality of Effluent in 1998							Comments
				Metals and TSM in mg/L							
				As	Cu	Ni	Pb	Zn	TSM	pH	
e. Crean Hill Mine	3,000 tpd	Mine water treated by lime addition		<0.01	<0.01	0.25	<0.01	<0.01	3.1	7.8	Above MEQS for Ni for 1 month
f. Garson Mine	3,600 tpd	Mine water treated by lime addition		<0.01	0.01	0.35	<0.01	<0.01	7.5	8.3	Above MEQS for Ni for 2 months
g. Whistle Mine	4,000 tpd	Settling pond and polishing pond for mine water		<0.01	0.02	0.26	<0.01	<0.01	3.7	7.4	Above MEQS for Ni for 1 month
5. Kidd Creek (Falconbridge), Timmins	Zinc, copper, lead (silver, cadmium), 13,000 tpd, underground	Tailings pond with partial recycle, pH adjustment, metal precipitation	Tailings Pond Effluent	<0.01	0.04	<0.01	<0.01	0.33	1.5	7.6	Above MEQS for Zn for 2 months
6. Winston Lake (Inmet), Schreiber	Zinc, copper, 1,000 tpd, underground	Tailings pond with partial recycle, lime addition, settling pond, polishing pond		<0.01	0.01	0.27	<0.01	0.01	2.3	8.2	Above MEQS for Ni for 2 months

Table 10 Treatment Facilities and Effluent Quality for Metal Mines in Quebec in 1998

Mine Name (Company), Location	Products (By-products), Rated Milling Capacity, Mining Method	Treatment Facility	Discharge Point	Annual Average Quality of Effluent in 1998							Comments
				Metals and TSM in mg/L							
				As	Cu	Ni	Pb	Zn	TSM	pH	
1. Bouchard-Hébert (Cambior), Val-d'Or	Copper, zinc, 2,800 tpd, underground	Settling pond and polishing pond	Final Effluent	0.01	0.03	0.05	0.01	0.07	4.7	7.7	Complied with all MEQS during 1998
2. Bousquet (Barrick), Preissac	Gold (silver), 5,000 tpd, underground; ore treated at Terrains Aurifères	Settling pond		0.01	0.02	0.04	0.01	0.09	2.0	7.3	Complied with all MEQS during 1998
3. Francoeur (Richmont), Arnfield	Gold, 1,100 tpd, underground; ore treated at Est-Malartic	Settling pond	Settling Pond	0.01	0.02	0.06	0.03	0.02	9.6	7.7	
4. Gaspé (Noranda), Murdochville	Copper (molybdenum), 5,000 tpd, underground	Tailings pond with partial recycle; settling pond for mine water	Com-bined Effluent	-	0.04	0.03	0.03	0.03	1.9	7.7	

Table 10 Treatment Facilities and Effluent Quality for Metal Mines in Quebec in 1998 (cont'd)

Mine Name (Company), Location	Products (By-products), Rated Milling Capacity, Mining Method	Treatment Facility	Discharge Point	Annual Average Quality of Effluent in 1998							Comments
				Metals and TSM in mg/L							
				As	Cu	Ni	Pb	Zn	TSM	pH	
5. Gonzague Langlois (Cambior), Val-d'Or	Zinc, copper, 2,200 tpd, underground	Tailings pond	Tailings Pond	0.01	0.03	0.05	0.01	0.08	5.0	7.0	Complied with all MEQS during 1998
			Ditch 3A	0.01	0.01	0.04	0.01	0.02	6.2	7.3	
			Ditch 3C	0.01	0.01	0.04	0.02	0.04	2.9	7.3	Complied with all MEQS during 1998
			Ditch 4	0.01	0.01	0.05	0.01	0.02	5.3	7.6	Complied with all MEQS during 1998
6. Horne (Noranda), Rouyn-Noranda	Copper (molybdenum), 5,000 tpd, underground	Tailings pond with partial recycle; settling pond for mine water	Tailings Pond Effluent (PI-06)	0.05	0.02	0.05	0.05	0.12	6.7	7.3	Achieved all MEQS during 1998
			Tailings Pond (# 12)	0.05	0.10	0.05	0.05	0.17	5.2	8.1	Above MEQS for Zn for 1 month
7. Joe Mann (Campbell Resources), Chibougamau	Gold (silver), 1,000 tpd, underground; ore treated at Principale	Treatment ponds in series	Final Effluent	-	0.03	-	0.06	-	4.9	7.6	
8. Joubi (Western), Val-d'Or	Gold (silver), 160 tpd, underground	Settling pond	Mine Water	0.01	0.01	0.01	0.02	0.02	3.2	7.8	
9. Kattinniq (Raglan), Ungava Peninsula	Nickel, copper (cobalt), 2,400 tpd, open pit	Sedimentation pond	DIR-UT	<0.01	0.02	0.19	<0.01	0.02	9.9	8.7	
			DIR-HS	<0.01	0.01	0.47	<0.01	0.01	0.5	10	Complied with all MEQS during 1998
10. Lac Matagami (Noranda), Matagami	Copper, zinc, 3,000 tpd, underground	Tailings pond	Final Effluent	0.05	0.01	0.02	0.04	0.06	2.7	8.6	
11. Lac Tio (QIT), Havre St-Pierre	Iron, titanium, 7,500 tpd, open pit	Tailings pond	Mine Water	<0.01	0.03	0.19	0.02	0.02	65.0	7.2	Above MEQS for TSM for 1 month
12. Louvicourt (Novicourt), Val-d'Or	Copper, zinc (gold), 5,000 tpd, underground	Polishing pond	Polishing Pond	0.01	0.04	0.06	0.02	0.03	7.7	7.4	

Table 10 Treatment Facilities and Effluent Quality for Metal Mines in Quebec in 1998 (cont'd)

Mine Name (Company), Location	Products (By-products), Rated Milling Capacity, Mining Method	Treatment Facility	Discharge Point	Annual Average Quality of Effluent in 1998							Comments
				Metals and TSM in mg/L							
				As	Cu	Ni	Pb	Zn	TSM	pH	
13. Mount-Wright (Québec Cartier), Fermont	Iron ore concentrate, 50,000 tpd, open pit	Tailings pond with recycle; treatment plant for red water	Mine Water, Lake Hesse South, HS-1	<0.01	<0.01	<0.01	0.02	0.05	2.9	7.1	
			Mine Water, Mont-Wright West, LW-1	<0.01	<0.01	<0.01	0.02	0.05	6.0	7.3	
			Mine Water, Mont Survie South, MS-2	<0.01	<0.01	0.01	0.02	0.05	18.5	7.1	Above MEQS for TSM for 1 month
14. Mouska (Cambior), Cadillac	Gold, 800 tpd, underground; ore treated at Yvan Vézina Mill	Settling pond	Mine Water	<0.01	0.06	-	-	-	7.0	7.6	
15. Niobec (Cambior), St-Honoré	Niobium, 3,500 tpd, underground	Tailings pond with partial recycle	Mine Water	-	0.03	0.02	0.05	0.07	15.3	7.7	Above MEQS for TSM for 1 month
			Tailings Pond	-	0.02	0.02	0.05	0.05	10.3	7.7	
16. Principale (Campbell Resources), Chibougamau	Gold (copper), 3,000 tpd, underground	Tailings pond and polishing pond	Effluent No. 2	-	0.18	-	0.06	-	5.0	7.6	Above MEQS for Cu for 2 months
17. Selbaie (Gencor), Joutel	Copper, zinc, silver, 2,900 tpd, underground	Thickened tailings disposal, settling pond for mine water	Polishing Pond	0.05	0.04	0.05	0.05	0.39	2.5	9.3	Above MEQS for Zn for 1 month
18. Sigma 2 (McWatters), Val-d'Or	Gold (silver), 290 tpd, open pit; ore treated at Sigma #1	Settling pond	Mine Water	0.02	0.01	0.02	0.01	0.02	7.1	8.0	Complied with all MEQS during 1998
19. Troilus (Inmet), Chibougamau	Gold, copper, 11,000 tpd, open pit	Tailings pond	Troilus PR - 1	0.03	0.02	0.01	0.01	0.02	24.1	8.0	Above MEQS for TSM for 2 months
			Troilus BS - 2	0.05	0.05	0.01	0.01	0.02	13.5	7.6	Complied with all MEQS during 1998

Table 11 Treatment Facilities and Effluent Quality for Metal Mines in New Brunswick in 1998

Mine Name (Company), Location	Products (By-products), Rated Milling Capacity, Mining Method	Treatment Facility	Discharge Point	Annual Average Quality of Effluent in 1998							Comments
				Metals and TSM in mg/L							
				As	Cu	Ni	Pb	Zn	TSM	pH	
1. Brunswick Mining No. 12 site (Noranda), Bathurst	Zinc, lead, copper (silver), 10,000 tpd, underground	High–density sludge treatment plant (also used for treating contaminated water from abandoned nearby BSM #6 open pit)	Effluent into Little River	-	0.01	-	0.01	0.27	2.9	9.0	
2. Caribou (CanZinco), Bathurst	Lead, zinc, 3,000 tpd, underground	Mine water treated by mine water treatment plant; treated mine water effluent combined with mill discharged into tailings pond which overflowed into polishing pond	Polishing Pond Effluent into 40-Mile Brook	0.01	0.1	-	0.12	0.14	4.2	7.6	Above MEQS for Pb for 1 month
3. Heath Steele (Noranda), Miramichi	Zinc, lead, copper, 3,600 tpd, underground	High–density sludge treatment plant commissioned in 1998 to treat effluent from Heath Steele as well as nearby abandoned Stratmat pit; the treatment plant discharged into the tailings pond	Tailings Pond Overflowed into South Tomogonops River	<0.01	0.01	-	0.01	0.07	2.2	9.2	
4. Restigouche (CanZinco), Bathurst	Lead, zinc, 1,350 tpd, open pit	A lime treatment plant/settling pond system handled runoff and pit water	Mixing Structure Discharged into Charlotte Brook	<0.01	<0.01	<0.01	<0.01	0.08	2.0	6.7	

Table 12 Treatment Facilities and Effluent Quality for Metal Mines in Newfoundland in 1998

Mine Name (Company), Location	Products (By-products), Rated Milling Capacity, Mining Method	Treatment Facility	Discharge Point	Annual Average Quality of Effluent in 1998							Comments
				Metals and TSM in mg/L							
				As	Cu	Ni	Pb	Zn	TSM	pH	
1. Iron Ore Company of Canada (Iron ore Company of Canada), Labrador City	Iron ore pellets and concentrate, 140,000 tpd, open pit	Tailings thickening before deposit in lake		Data not available							Unconfined disposal authorized prior to 1977; performance not assessed
2. Wabush (Stelco), Wabush	Iron ore concentrate, 54,400 tpd, open pit	Tailings thickening before deposit in lake, partial recycle	East Pit No. 1 Dewa-tering	-	-	-	-	-	3.6	6.4	
			East Pit No. 2 Settling Basin	-	-	-	-	-	2.6	6.0	Below MEQS for pH for 4 months
			South Pit	-	-	-	-	-	6.8	6.5	Above MEQS for TSM for 1 month

Figure 3
Performance of Mines Subject to the MMLER in the Pacific and Yukon Region in 1998

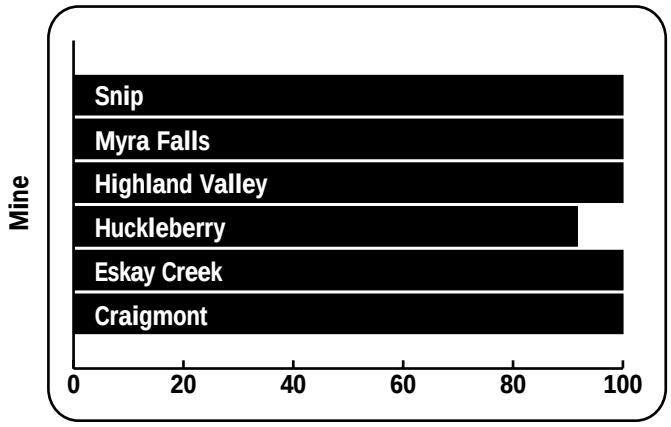


Figure 4
Performance of Mines Subject to the MMLER in the Prairie and Northern Region in 1998

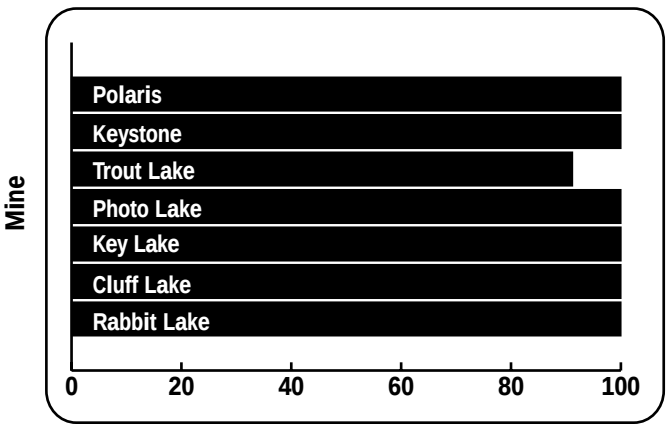


Figure 5
Performance of Mines Subject to the MMLEG in the Prairie and Northern Region in 1998

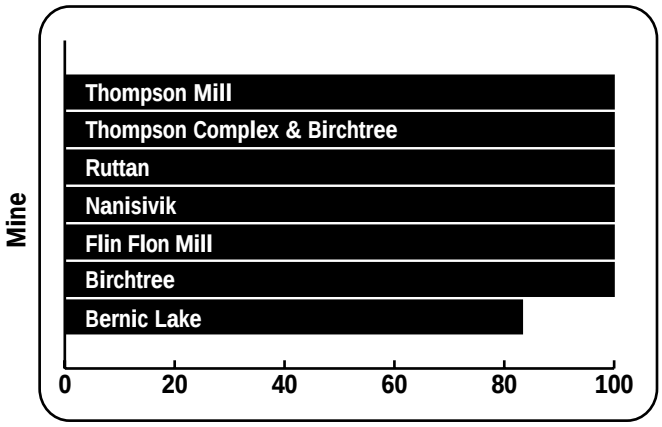


Figure 6
Performance of Mines Subject to the MMLER in the Ontario Region in 1998

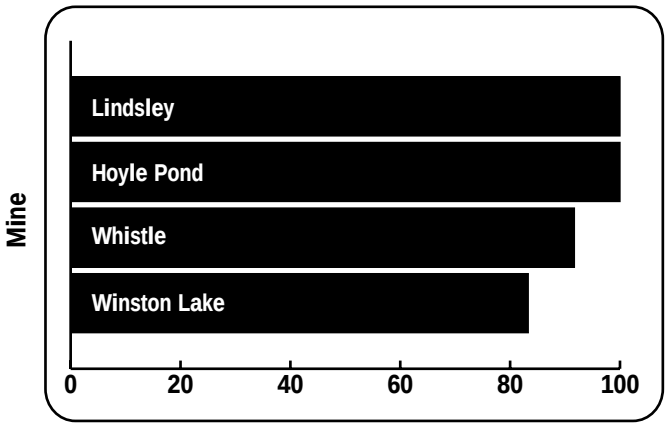


Figure 7
Performance of Mines Subject to the MMLEG in the Ontario Region in 1998

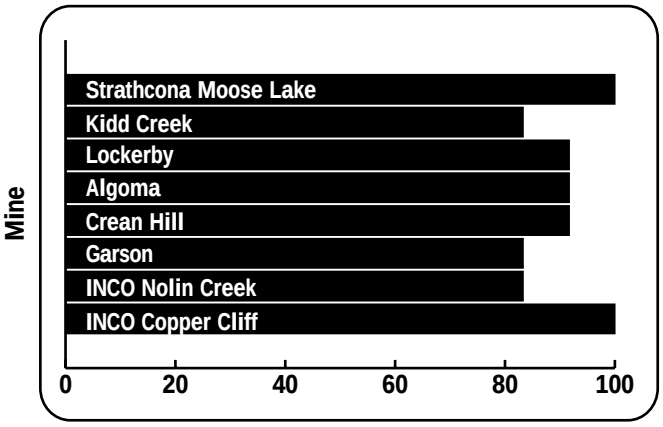


Figure 8
Performance of Mines Subject to the MMLER in the Quebec Region in 1998

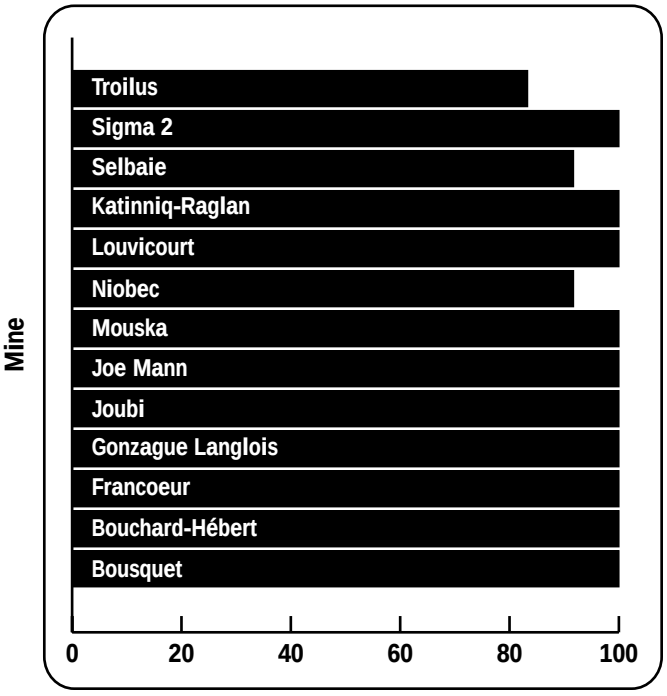


Figure 9
Performance of Mines Subject to the MMLEG in the Quebec Region in 1998

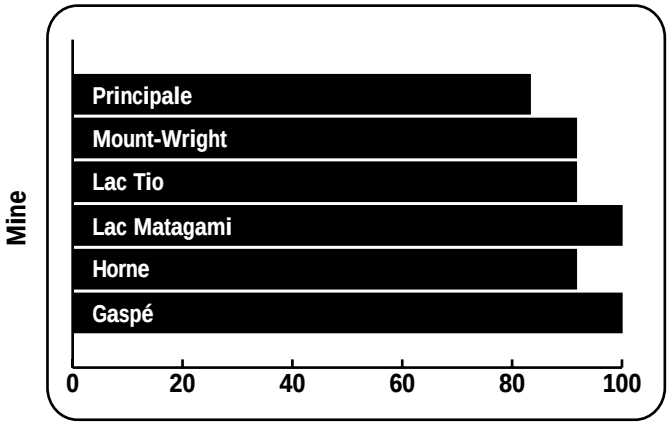


Figure 10
Performance of Mines Subject to the MMLER in the Atlantic Region in 1998

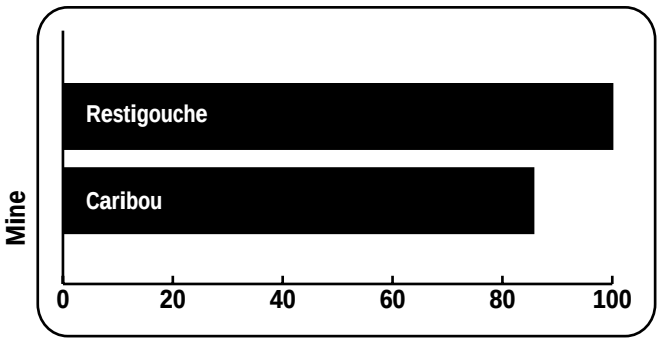
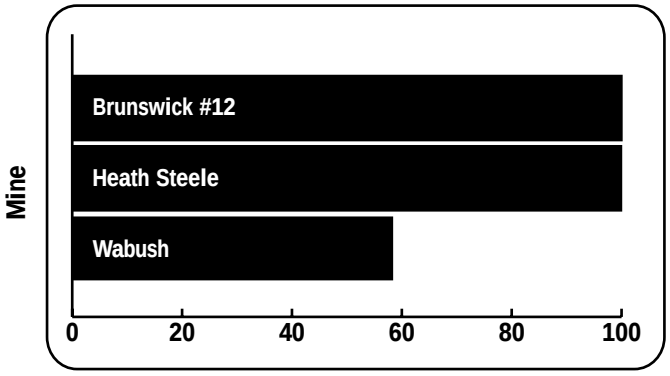


Figure 11
Performance of Mines Subject to the MMLEG in the Atlantic Region in 1998



4.0 EFFLUENT TREATMENT TECHNOLOGY APPLICABLE TO MINING AND MILLING OPERATIONS

If properly applied, commercially available effluent treatment technology can produce effluents of sufficient quality to meet the requirements prescribed in the MMLER.

The complexity of effluent quality problems varies considerably among mines. At some mines, the application of basic treatment technology can provide satisfactory environmental protection, while at others the application of more advanced methods is required. New methods, and improvements in the application of current technology, continue to be developed and implemented.

Treatment of effluents at metal mining and milling operations to avoid adverse effects on the aquatic environment include the removal of suspended solids and dissolved metals and the neutralization of acidic waters. In uranium mines, radium-226 must also be reduced. At gold milling operations, the cyanide concentration may have to be reduced to meet provincial or territorial limits as well as Section 36 of the *Fisheries Act* before the effluent is released.

Effluent treatment technologies applicable to the management of Canadian mining effluents are briefly reviewed in this section. Further details on these technologies are available in the document entitled "Report on Technologies Applicable to the Management of Canadian Mining Effluents" (SENES Consultants Limited for Environment Canada, March 1999).

4.1 Removal of Solids

The processing of an ore begins with crushing and grinding, which results in the production of finely sized particles. The valuable metals contained in the ore are concentrated and recovered primarily by physical methods. In the milling of uranium ores, uranium is recovered by a chemical process involving dissolution in sulphuric acid. During the milling process, the bulk of the ore treated is rejected as waste in the form of finely ground rock particles. Gold may be extracted from ore by a chemical process involving the use of sodium cyanide. Since the desired minerals constitute a very low percentage of an ore, mills produce very large quantities of wastes, referred to as tailings.

Tailings are discharged from a mill as a slurry of solids in water. The first step in the effluent treatment process is the removal and permanent retention of these waste mineral particles. This is accomplished by discharging the slurry into a tailings pond where the solids are settled out and permanently retained. The decanted water is either recycled to the mill or treated and discharged to the environment.

In most cases, part of the tailings pond water is recycled and reused in the mill. In cases where evaporation rates are high, the pond water may be totally recirculated, meaning that no effluent is discharged from the tailings pond. Careful design, construction and operation of tailings ponds is essential to achieve the levels of total suspended matter prescribed in the MMLER. Mine water and surface drainage, which may contain fine particles of rock, often require treatment in tailings ponds or separate settling ponds.

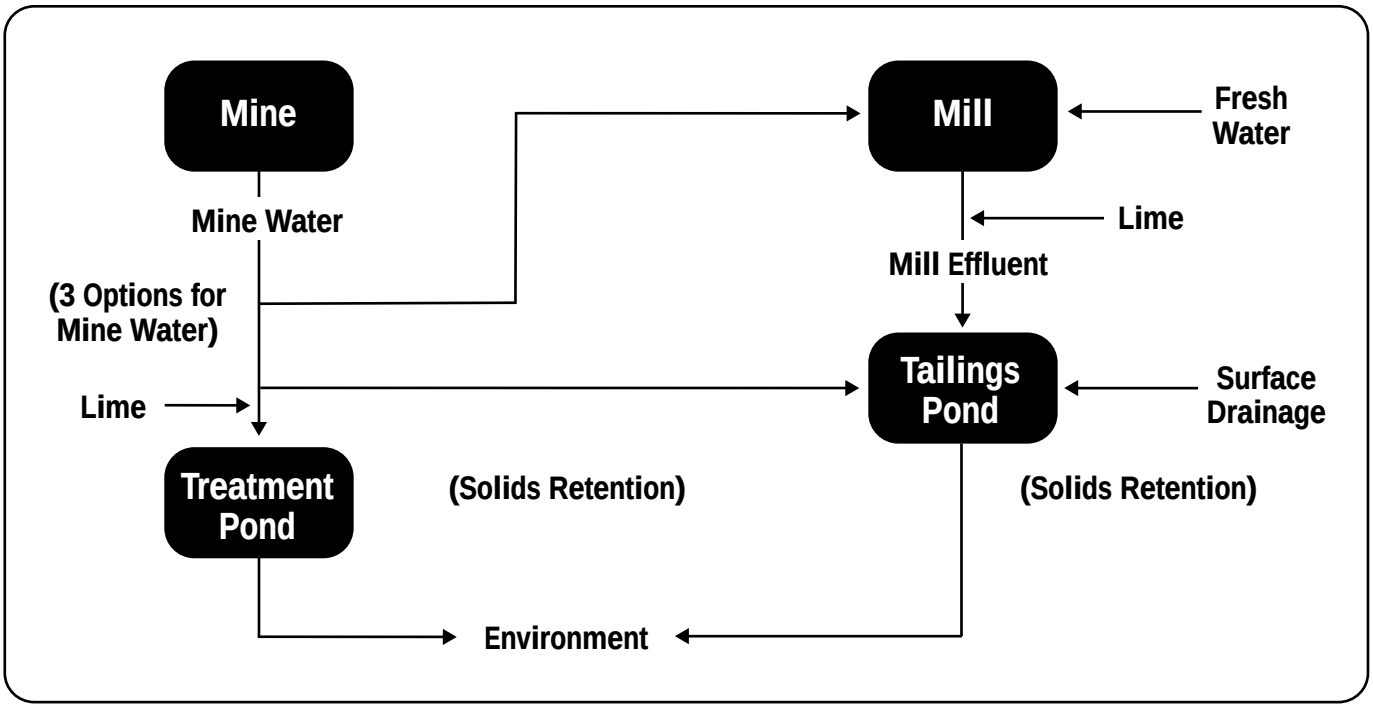
A typical flow sheet for the treatment of effluents at a mine-mill complex is shown in Figure 12.

4.2 Neutralization and Removal of Metals

Effluents that are highly acidic and contain dissolved metals including copper, iron, lead, nickel and zinc are often a problem at metal mines where the ore, tailings or waste rock contain significant amounts of iron sulphides, particularly the reactive sulphides pyrite and pyrrhotite. The oxidation of sulphides can produce acidic water and dissolve associated metals.

Such effluents are commonly referred to as acid mine drainage (AMD), which is characterized by low pH and high metal contents. AMD is treated by the addition of an alkaline reagent (generally lime) to neutralize the acidity and increase the pH, and to precipitate the metals as hydroxides. Lime is usually added in the mill so that the metal hydroxide precipitates form en route to the tailings pond and are co-deposited in the tailings pond with the mill tailings.

Figure 12 Mine-Mill Effluent Treatment Flow Sheet



The presence of sulphate results in the precipitation of gypsum as well as metal hydroxides, and the resulting sludges are often difficult to settle. Acidic mine water or surface drainage may be limed ahead of tailings ponds or separate settling ponds. While perhaps only one-third of the mines in Canada have acid mine water, it is a particularly significant problem because fish are extremely sensitive to both acidity and heavy metals.

In recent years, additional controls have been developed to ensure the protection of particularly sensitive aquatic environments. One such installation uses the precipitation of metal sulphides followed by sand filtration. Such methods are generally applicable to operations where effluent flow rates are comparatively low.

4.3 Removal of Radium-226

Uranium is recovered from finely ground ore by leaching in sulphuric acid. Other metals present in the ore, including the radionuclides radium-226, thorium-230, thorium-232 and lead-210, enter solution simultaneously with uranium.

The first step in the treatment of a uranium mill tailings slurry is the addition of lime in the mill followed by separation of the solid tailings in a tailings pond. Most of the dissolved radioactive and non-radioactive metals present in the tailings slurry form precipitates upon the addition of lime, settle out in the tailings ponds, and are covered by normal mill tailings. Since the activity of radium-226 remains relatively high in the tailings pond overflow, additional treatment is required for its removal. Radium-226 is removed from tailings pond water by the addition of a dilute solution of barium chloride to produce a precipitate of barium-radium-sulphate, which is settled out in sedimentation ponds or removed by sand filters. The resulting sludges are returned to the tailings pond for retention.

4.4 Removal of Cyanide

Cyanide is commonly used in the milling of some base metal ores, but rarely in quantities of concern. Historically, this has been done through the natural degradation of cyanide and its metal complexes by retaining the water in a tailings pond for a length of time commensurate with the cyanide content of the influent, the pond's surface area and local climatic conditions.

Because cyanide is extensively used in gold mills for the dissolution and recovery of gold from ore, there is a need to remove cyanide and cyanide-metal compounds from effluents discharged by these mills. A number of chemical processes are now available for the removal of cyanide in gold mill effluents. Most of these processes, some newly developed, have been installed at Canadian gold mills over the past few years. Although the removal of cyanide by this means has generally proven satisfactory at mines where sufficient retention time is available, this has not always been the case. This has led to the development and widespread installation of chemical treatment systems for cyanide removal, often coupled with natural degradation. These chemical systems, all based on the oxidation of cyanide, typically use either hydrogen peroxide or a combination of sulphur dioxide and air. Biological oxidation systems may also be used for cyanide removal.

4.5 Effluent Treatment Plants

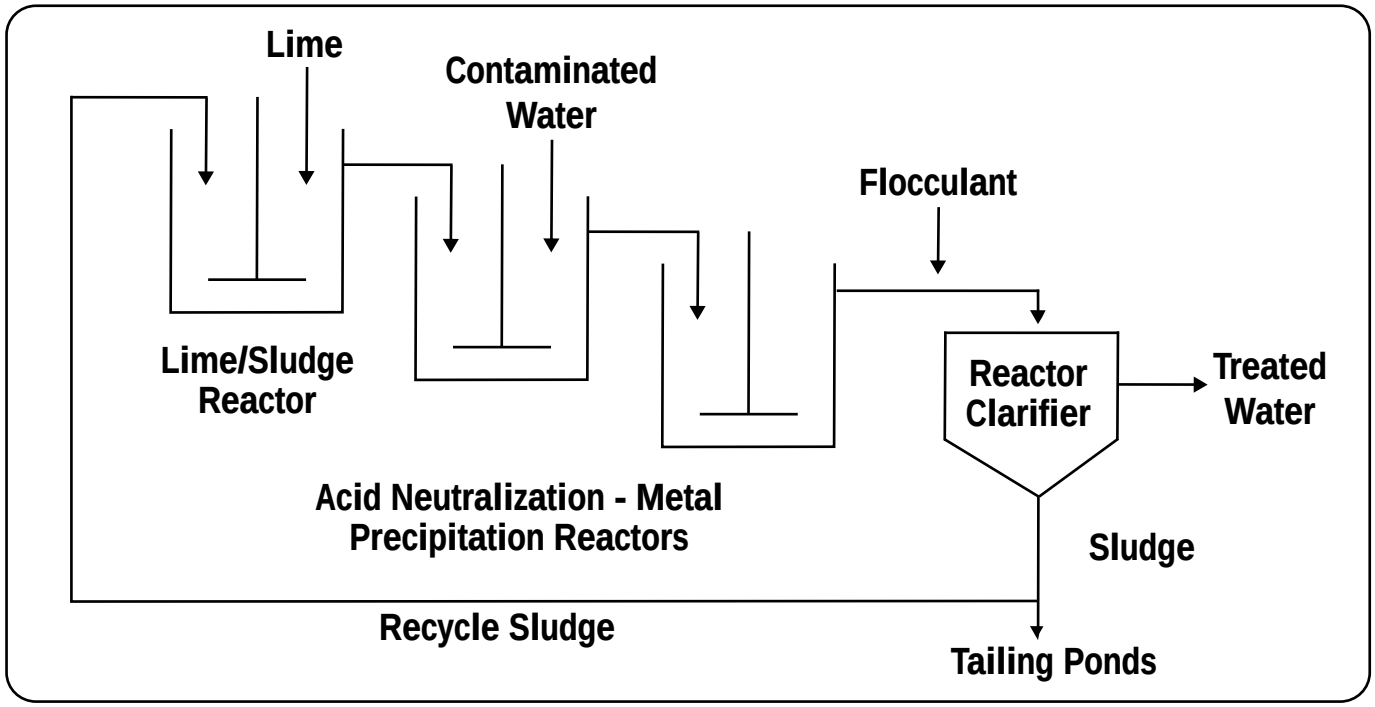
As was previously mentioned, most mine and mill effluents are treated by the addition of a neutralizing reagent, usually lime.

In the case of mine water, lime is usually added to the water in a mixing box or the mine water line en route to a settling pond in which the precipitated metal hydroxides are collected. In the case of mill effluents, the lime is added in the mill before the tailings are discharged to the tailings pond.

A flow sheet for a typical mechanical-type treatment plant is shown in Figure 13. Treatment commonly consists of adding the alkali in a series of mechanically agitated reactor tanks, some with aeration to oxidize ferrous iron to ferric iron where necessary. The metal hydroxide-gypsum precipitates are separated from the bulk of water by settling in thickeners or clarifiers, and are disposed of in a tailings pond or in a separate impoundment area. The treated water is then released to the environment. In some plants, a portion of the thickened underflow sludge is recirculated to the neutralization reactors to increase the solids content in the waste sludge.

The mechanical effluent treatment plants in operation at uranium mines generally consist of a series of mechanically operated reactor tanks (up to five at one plant) followed by sand filters. Lime and barium chloride are added to the reactor tanks to form a barium-radium-sulphate precipitate that is separated from the water by filtration. The precipitate is regularly back-washed from the filters and is discharged to the tailings pond.

Figure 13 Mechanical Effluent Treatment Plant Flow Sheet



REFERENCES

Canada Gazette, *The Alice Arm Tailings Deposit Regulations*, SOR/79-345, Part II, Vol. 113, No. 8, Queen's Printer, Ottawa, Ontario (April 10, 1979).

Environment Canada, *Metal Mining Liquid Effluent Regulations and Guidelines* (includes *Metal Liquid Effluent Regulations*, Guidelines for the Control of Liquid Effluents from Existing Mines, Guidelines for the measurement of Acute Lethality in Liquid Effluents from Metal Mines, Explanatory Notes and Environmental Code of Practice for Mines), Water Pollution Control Directorate, Ottawa, Ontario, Report EPS 1-WP-77-1 (1977).

Environment Canada, *Status Report on Water Pollution Control in the Canadian Metal Mining Industry (1982)*, Conservation and Protection, Ottawa, Ontario, Report EPS 1/MM/2 (1985).

Environment Canada, *Mine and Mill Wastewater Treatment*, Conservation and Protection, Ottawa, Ontario, Report EPS 2/MM/3 (1987).

Environment Canada, *Status Report on Water Pollution Control in the Canadian Metal Mining Industry (1986)*, Conservation and Protection, Ottawa, Ontario, Report EPS 1/MM/3 (1988).

Environment Canada, *Gold Mining Effluent Treatment Seminars*, Mississauga, Ontario (1989).

Environment Canada, *Biological Test Method: Reference Method for Determining Acute Lethality of Effluents to Rainbow Trout*, July 1990, as amended in May 1996, Report EPS 1/RM/13.

Environment Canada, *Status Report on Water Pollution Control in the Canadian Metal Mining Industry (1990 and 1991)*, Conservation and Protection, Ottawa, Ontario, Report EPS 1/MM/4 (1992).

Environment Canada, *Status Report on Water Pollution Control in the Canadian Metal Mining Industry (1994)*, Conservation and Protection, Ottawa, Ontario, Report EPS 1/MM/5 (1997).

Government of Canada, *Consolidated Regulations of Canada 1978*, Chapter 819 – *Metal Mining Liquid Effluent Regulations*, Queen's Printer, Ottawa, Ontario (1978).

SENES Consultants Limited, *Report on Technologies Applicable to Management of Canadian Mining Effluents*, prepared for Environment Canada, March 1999.

APPENDIX A MINING COMPANIES INCLUDED IN THE ASSESSMENT

List of Mining Companies Included in the Assessment of 1998 Performance

Algoma Steel Inc.
Barrick Gold Corporation
Black Hawk Mining Inc.
Boliden Westmin (Canada) Ltd.
Breakwater Resources Ltd.
Cabot Corporation
Cambior Inc.
Cameco Corporation
Campbell Resources Inc.
CanZinco Ltd.
Cogema Resources Inc.
Cominco Ltd.
Craigmont Mines Ltd.
Falconbridge Ltd.
Gencor Ltd.
Hudson Bay Mining & Smelting Co. Ltd.
INCO Ltd.
Inmet Mining Corporation
Iron Ore Company of Canada
Kinross Gold Corporation
McWatters Mining Inc.
Noranda Mining and Exploration Inc.
Novicourt Inc.
Prime Resources Group Inc.
Princeton Mining Corporation.
QIT-Fer et Titane Inc.
Québec Cartier Mining Co.
Richmont Mines Inc.
Société Minière Raglan du Québec
Stelco Inc.
Teck Corporation
Thompson Creek Mining Co.
Western Quebec Mines Inc.
Westmin Resources Ltd.

APPENDIX B MINE EFFLUENT QUALITY COMPLIANCE, ACHIEVEMENT AND EXCEEDANCES FOR 1998

Note to Readers

The tables presented in this Appendix summarize the effluent quality data for mines subject to the MMLER and MMLEG in 1998. The summaries include site identification (i.e., mine/mill name and effluent discharge name), the percentage of monthly effluent quality data meeting the prescribed limits or performance objectives, the total number of samples, the number of samples that exceeded at least one limit for a given month, and the distribution of the non-compliant parameters. The parameters included are: total suspended matter (TSM), arsenic (As), copper (Cu), nickel (Ni), lead (Pb), zinc (Zn), radium-226 (Ra-226) and pH.

Table B1 Performance Summary for Mines Subject to MMLER in 1998

Metal Mining Liquid Effluent Regulations (MMLER)

1998 Monthly Average Data Quality of Mining Effluents

SITE IDENTIFICATION			Monthly Quality %	Samples Total	Samples Failed	TSM **25** mg/L	As **0.5** mg/L	Cu **0.3** mg/L	Ni **0.5** mg/L	Pb **0.2** mg/L	Zn **0.5** mg/L	Ra-226 T **10** p Ci/L	Ph **6**
Company Name	**Mine/Mill Name**	**Effluent Discharge Name**											
CAMBIOR INC.	Bouchard-Hébert	Final Effluent	100	12	0								
BARRICK GOLD CORPORATION	Bousquet #2		100	12	0								
COGEMA RESOURCES INC.	Cluff Lake	Treated Effluent	100	12	0								
CRAIGMONT MINES LTD.	Craigmont		100	12	0	No surface effluent							
PRIME RESOURCES GROUP INC.	Eskay Creek	D3	100	12	0								
PRIME RESOURCES GROUP INC.	Eskay Creek	D7	100	12	0								
PRIME RESOURCES GROUP INC.	Eskay Creek	W20	100	12	0								
RICHMONT MINES INC.	Francoeur	Settling Pond Discharge	100	12	0								
CAMBIOR INC.	Gonzague Langlois	Tailings Pond	100	12	0								
CAMBIOR INC.	Gonzague Langlois	Ditch 3A	100	12	0								
CAMBIOR INC.	Gonzague Langlois	Ditch 3C	100	12	0								
CAMBIOR INC.	Gonzague Langlois	Ditch 4	100	12	0								
COMINCO LTD.	Highland Valley Copper	Bose Lake Discharge	100	12	0								
COMINCO LTD.	Highland Valley Copper	Pukaist Creek Discharge	100	12	0								
COMINCO LTD.	Highland Valley Copper	Trojan Creek Discharge	100	12	0								
COMINCO LTD.	Highland Valley Copper	Witches Brook Discharge	100	12	0								
KINROSS GOLD CORPORATION	Hoyle Pond		100	12	0	No surface effluent							
PRINCETON MINING CORPORATION	Huckleberry	SC-02	100	12	0								
PRINCETON MINING CORPORATION	Huckleberry	SC-02 Seep	100	12	0								
PRINCETON MINING CORPORATION	Huckleberry	SC-03	100	12	0								
PRINCETON MINING CORPORATION	Huckleberry	SC-04	100	12	0								
PRINCETON MINING CORPORATION	Huckleberry	SC-04 Seep	100	12	0								
CAMPBELL RESOURCES	Joe Mann	Final Effluent	100	12	0								
WESTERN QUEBEC MINES INC.	Joubi	Mine Water	100	12	0								
SOCIETE MINIERE RAGLAN DU QUEBEC	Katinniq	DIR-UT	100	12	0								
SOCIETE MINIERE RAGLAN DU QUEBEC	Katinniq	DIR-HS	100	12	0								
CAMECO CORPORATION	Key Lake	Treated Mill Effluent	100	12	0								
BLACK HAWK MINING INC.	Keystone	Sediment. #1	100	12	0								
BLACK HAWK MINING INC.	Keystone	Sediment. #2	100	12	0								
NOVICOURT INC.	Louvicourt	Polishing Pond Discharge	100	12	0								
CAMBIOR INC.	Mouska	Mine Water	100	12	0								
BILIDEN WESTMIN (Canada) LIMITED	Myra Falls Operations	Pond	100	12	0								
TECK CORPORATION & CAMBIOR INC.	Niobec	Tailings Pond	100	12	0								
HUDSON BAY MINING AND SMELTING CO., LTD	Photo Lake	End of pipe Discharge	100	12	0								
COMINCO LTD.	Polaris	Sample Station 262-7	100	12	0								
CAMECO CORPORATION	Rabbit Lake	Treated Mill Effluent, Station 2.3.3	100	12	0								
CANZINCO LTD	Restigouche	Mixing Structure Discharged into Charlotte Brook	100	12	0								
McWATTERS MINING INC.	Sigma 2	Mine Water	100	12	0								
PRIME RESOURCES GROUP INC.	Snip	Sky Creek	100	12	0								
FALCONBRIDGE LTD	Thayer Lindsley		100	12	0	No surface effluent							
INMET MINING CORPORATION	Troilus	BS-2	100	12	0								
CANZINCO LTD	Caribou	Polishing Pond Discharge	91	12	1					1			
PRINCETON MINING CORPORATION	Huckleberry	East Zone	91	12	1	1							
GENCOR LTD.	Les Mines Selbaie	Polishing Pond Discharge	91	12	1						1		
TECK CORPORATION & CAMBIOR INC.	Niobec	Mine Water	91	12	1	1							
HUDSON BAY MINING AND SMELTING CO., LTD	Trout Lake	Treatment Plant Discharge	91	12	1	1							
INCO LIMITED	Whistle		91	12	1				1				
INMET MINING CORPORATION	Troilus	PR-1	83	12	2	2							
INMET MINING CORPORATION	Winston Lake Division		83	12	2				2				
Effluents - Regulations			98.3	588	10	5			3	1	1		

Note: Performance percentages are based on effluent discharged points.

Table B2 Performance Summary for Mines Subject to MMLEG in 1998

Metal Mining Liquid Effluent Guidelines (MMLEG)

1998 Monthly Average Data Quality of Mining Effluents

SITE IDENTIFICATION			Monthly Quality %	Samples Total	Samples Failed	TSM **25** mg/L	As **0.5** mg/L	Cu **0.3** mg/L	Ni **0.5** mg/L	Pb **0.2** mg/L	Zn **0.5** mg/L	Ra-226 T **10** p Ci/L	Ph **6**
Company Name	**Mine/Mill Name**	**Effluent Discharge Name**											
INCO LIMITED	Birchtree	LP#1	100	12	0								
INCO LIMITED	Birchtree	LP#2	100	12	0								
NORANDA MINING AND EXPLORATION INC.	Brunswick#12	Effluent discharged into Little River	100	12	0								
INCO LIMITED	Copper Cliff Treatment Plant		100	12	0								
THOMPSON CREEK MINING COMPANY	Endako		Data not available, mine not assessed										
HUDSON BAY MINING AND SMELTING CO., LTD	Flin Flon Mill	Tailings Pond North Weir	100	12	0								
NORANDA MINING AND EXPLORATION INC.	Gaspé Copper	Combined Effluent	100	12	0								
WESTMIN RESOURCES LIMITED	Gibraltar		Data not available, mine not assessed										
NORANDA MINING AND EXPLORATION INC.	Heath Steele	Tailings Pond Overflowed into South Tomogonops River	100	12	0								
NORANDA MINING AND EXPLORATION INC.	Horne Division	Pl-06	100	12	0								
IRON ORE COMPANY OF CANADA	Iron Ore Company of Canada		Data not available, mine not assessed										
NORANDA MINING AND EXPLORATION INC.	Lac Matagami	Final Effluent	100	12	0								
QUEBEC CARTIER MINING COMPANY	Mount-Wright	Mine Water, Lake Hesse South, HS-1	100	12	0								
QUEBEC CARTIER MINING COMPANY	Mount-Wright	Mine Water, Mount-Wright West, LW-1	100	12	0								
BREAKWATER RESOURCES LTD.	Nanisivik	Pond Effluent 159 - 4	100	12	0								
HUDSON BAY MINING AND SMELTING CO., LTD	Ruttan	Brehaut Lake Outfall	100	12	0								
FALCONBRIDGE LTD.	Strathcona (Moose Lake)		100	12	0								
INCO LIMITED	Thompson Cplx & Birchtree	T3 Culvert	100	12	0								
INCO LIMITED	Thompson Mill	Tailings Pond Discharged to Misery Lake	100	12	0								
STELCO INC.	Wabush	East Pit No.1	100	12	0								
ALGOMA STEEL INC.	Algoma Ore Division		91	12	1	1							
INCO LIMITED	Crean Hill		91	12	1				1				
NORANDA MINING AND EXPLORATION INC.	Horne Division	#12	91	12	1						1		
QIT-FER ET TITANE INC.	Lac Tio	Mine Water	91	12	1	1							
FALCONBRIDGE LTD.	Lockerby	Lockerby	91	12	1				1				
QUEBEC CARTIER MINING COMPANY	Mount-Wright	Mine Water, Mount Survie South, MS-2	91	12	1	1							
STELCO INC.	Wabush	South Pit	91	12	1	1							
CABOT CORPORATION	Bernic Lake	Tailings Pond Discharge	83	12	2	2							
INCO LIMITED	Garson		83	12	2				2				
FALCONBRIDGE LTD.	Kidd Creek	Tailings Pond Effluent	83	12	2						2		
INCO LIMITED	Nolin Creek Treatment Plant		83	12	2				2				
CAMPBELL RESOURCES	Principale	Effluent No. 2	83	12	2			2					
COMINCO LTD.	Sullivan	Kootenay	83	12	2						2		
STELCO INC.	Wabush	East Pit No. 2	66	12	4								4
Effluents - Guidelines			93.8	372	23	6		2	6		5		4

Note: Performance percentages are based on effluent discharged points.

APPENDIX C MONTHLY AVERAGE EFFLUENT QUALITY DATA

Note to Readers

The tables presented in this Appendix show the monthly average sample concentrations for each mining effluent. Supporting information includes:

- Mine/Mill Name
- Company Name
- Mine Operator Name
- Location
  - -City
  - -Province
  - -Region
  - -Site Coordinates (latitude and longitude)
- Mining Sector
  - -Precious Metals
  - -Base Metals
  - -Uranium
  - -Iron Ore
- Mine Product(s)
- Regulatory Status (subject to MMLER or MMLEG)
- Identification of Effluent Discharge Point
- Comments (if applicable)
- Parameter Limits
- Monthly Average Concentrations

Boxed data indicates that a monthly effluent quality standard (MEQS) was exceeded for that month. Tables are in alphabetical order based on mine/mill name.

Metal Mining Liquid Effluent Regulations (MMLER) & Guidelines (MMLEG)

Monthly Average Effluent Quality Data

Mine/Mill Name	Algoma Ore Division
Company Name	ALGOMA STEEL INC.
Operator Name	Algoma Steel Inc.
City	Wawa
Province	Ontario
Region	Ontario
Latitude/Longitude	48 00 N / 84 45 W
Sector	Iron
Product	Iron
Regulatory Status	Guidelines
Effluent Discharge Point	
Comments	Mine closed June 30,1998

Parameters		Limits	January	February	March	April	May	June	July	August	Sep.	Oct.	Nov.	Dec.
Flow	(m^3/d)	-	-	-	-	-	-	-	-	-	-	-	-	-
TSM	(mg/L)	25	10.990	**37.100**	8.700	1.800	2.100	2.200	-	-	-	-	-	-
As	(mg/L)	0.5	0.005	0.005	0.005	0.005	0.005	0.005	-	-	-	-	-	-
Cu	(mg/L)	0.3	0.040	0.013	0.037	-	0.018	0.010	-	-	-	-	-	-
Ni	(mg/L)	0.5	0.034	0.034	0.030	-	0.021	0.010	-	-	-	-	-	-
Pb	(mg/L)	0.2	0.044	0.030	0.030	0.030	0.030	0.030	-	-	-	-	-	-
Zn	(mg/L)	0.5	0.010	0.020	0.007	0.012	0.010	0.013	-	-	-	-	-	-
Ra-226	(pCi/L)	10	-	-	-	-	-	-	-	-	-	-	-	-
pH		>6.0	7.8	8.5	7.6	7.2	7.6	7.8	-	-	-	-	-	-

Boxed data indicates that a monthly effluent quality standard (MEQS) was exceeded for that month.

Metal Mining Liquid Effluent Regulations (MMLER) & Guidelines (MMLEG)

Monthly Average Effluent Quality Data

Mine/Mill Name	Bernic Lake
Company Name	CABOT CORPORATION
Operator Name	Tantalum Mining Corporation of Canada Limited
City	Lac du Bonnet
Province	Manitoba
Region	Prairie and Northern
Latitude/Longitude	50 26 N / 95 27 W
Sector	Base metals
Product	Lithium-Cesium-Rubidium
Regulatory Status	Guidelines
Effluent Discharge Point	Tailings Pond Discharge
Comments	As, Cu, Pb, Ni, Zn given for July only

Parameters	Limits	January	February	March	April	May	June	July	August	Sep.	Oct.	Nov.	Dec.
Flow (m^3/month)	-	67800	80400	141800	127600	86100	5400	107000	71700	101300	61977	68400	48500
TSM (mg/L)	25	12.400	**35.300**	22.400	11.800	14.200	16.080	19.680	**25.280**	24.267	20.400	18.100	12.667
As (mg/L)	0.5	-	-	-	-	-	-	0.009	-	-	-	-	-
Cu (mg/L)	0.3	-	-	-	-	-	-	0.005	-	-	-	-	-
Ni (mg/L)	0.5	-	-	-	-	-	-	0.010	-	-	-	-	-
Pb (mg/L)	0.2	-	-	-	-	-	-	0.001	-	-	-	-	-
Zn (mg/L)	0.5	-	-	-	-	-	-	0.010	-	-	-	-	-
Ra-226 (pCi/L)	10	-	-	-	-	-	-	-	-	-	-	-	-
pH	>6.0	6.9	6.7	6.6	7.0	8.5	8.6	8.4	9.1	8.8	7.9	7.6	7.9

Boxed data indicates that a monthly effluent quality standard (MEQS) was exceeded for that month.

Metal Mining Liquid Effluent Regulations (MMLER) & Guidelines (MMLEG)

Monthly Average Effluent Quality Data

Mine/Mill Name	Birchtree
Company Name	INCO LIMITED
Operator Name	INCO Limited
City	Thompson
Province	Manitoba
Region	Prairie and Northern
Latitude/Longitude	55 42 N / 97 55 W
Sector	Base metals
Product	Nickel-Copper
Regulatory Status	Guidelines
Effluent Discharge Point	LP#1
Comments	No discharge in January, February and March (frozen)

Parameters	Limits	January	February	March	April	May	June	July	August	Sep.	Oct.	Nov.	Dec.
Flow (m^3/month)	-	-	-	-	172800	381024	246240	107136	53568	43200	35712	35712	10800
TSM (mg/L)	25	-	-	-	7.000	3.750	0.250	0.800	0.250	0.800	0.500	1.500	4.667
As (mg/L)	0.5	-	-	-	-	-	-	-	-	-	-	-	-
Cu (mg/L)	0.3	-	-	-	-	-	-	-	-	-	-	-	-
Ni (mg/L)	0.5	-	-	-	0.065	0.020	0.028	0.022	0.023	0.048	0.063	0.070	0.083
Pb (mg/L)	0.2	-	-	-	-	-	-	-	-	-	-	-	-
Zn (mg/L)	0.5	-	-	-	-	-	-	-	-	-	-	-	-
Ra-226 (pCi/L)	10	-	-	-	-	-	-	-	-	-	-	-	-
pH	>6.0	-	-	-	7.1	7.5	7.9	8.0	8.3	8.3	8.4	8.2	8.2

Metal Mining Liquid Effluent Regulations (MMLER) & Guidelines (MMLEG)

Monthly Average Effluent Quality Data

Mine/Mill Name	Birchtree
Company Name	INCO LIMITED
Operator Name	INCO Limited
City	Thompson
Province	Manitoba
Region	Prairie and Northern
Latitude/Longitude	55 42 N / 97 55 W
Sector	Base metals
Product	Nickel-Copper
Regulatory Status	Guidelines
Effluent Discharge Point	LP#2
Comments	

Parameters	Limits	January	February	March	April	May	June	July	August	Sep.	Oct.	Nov.	Dec.
Flow (m^3/month)	-	15413	17783	19992	24097	20088	13727	15678	15089	13405	13712	13539	13709
TSM (mg/L)	25	-	-	-	3.500	1.750	0.250	1.000	1.250	1.000	1.250	2.750	0.800
As (mg/L)	0.5	-	-	-	-	-	-	-	-	-	-	-	-
Cu (mg/L)	0.3	-	-	-	-	-	-	-	-	-	-	-	-
Ni (mg/L)	0.5	0.340	0.405	0.203	0.414	0.235	0.408	0.110	0.265	0.238	0.150	0.128	0.304
Pb (mg/L)	0.2	-	-	-	-	-	-	-	-	-	-	-	-
Zn (mg/L)	0.5	-	-	-	-	-	-	-	-	-	-	-	-
Ra-226 (pCi/L)	10	-	-	-	-	-	-	-	-	-	-	-	-
pH	>6.0	7.4	7.9	7.6	6.6	7.6	7.7	7.7	8.0	7.6	7.6	7.9	7.4

Metal Mining Liquid Effluent Regulations (MMLER) & Guidelines (MMLEG)

Monthly Average Effluent Quality Data

Mine/Mill Name	Bouchard-Hébert
Company Name	CAMBIOR INC.
Operator Name	Cambior Inc.
City	30 km North-East of Rouyn-Noranda
Province	Quebec
Region	Quebec
Latitude/Longitude	48 23 N / 78 54 W
Sector	Base metals
Product	Zinc-Copper-Gold-Silver
Regulatory Status	Regulations
Effluent Discharge Point	Final Effluent
Comments	Discharged from August to December

Parameters	Limits	January	February	March	April	May	June	July	August	Sep.	Oct.	Nov.	Dec.
Flow (m^3/d)	-	-	-	-	-	-	-	-	14454	11902	12110	12060	10872
TSM (mg/L)	25	-	-	-	-	-	-	-	7.400	2.700	5.400	4.400	3.600
As (mg/L)	0.5	-	-	-	-	-	-	-	0.010	0.001	0.001	0.010	0.001
Cu (mg/L)	0.3	-	-	-	-	-	-	-	0.040	0.030	0.030	0.040	0.030
Ni (mg/L)	0.5	-	-	-	-	-	-	-	0.090	0.001	0.001	0.020	0.001
Pb (mg/L)	0.2	-	-	-	-	-	-	-	0.010	0.001	0.001	0.010	0.001
Zn (mg/L)	0.5	-	-	-	-	-	-	-	0.030	0.040	0.060	0.110	0.120
Ra-226 (pCi/L)	10	-	-	-	-	-	-	-	-	-	-	-	-
pH	>6.0	-	-	-	-	-	-	-	8.6	7.9	7.5	7.2	7.3

Metal Mining Liquid Effluent Regulations (MMLER) & Guidelines (MMLEG)

Monthly Average Effluent Quality Data

Mine/Mill Name	Bousquet #2
Company Name	BARRICK GOLD CORPORATION
Operator Name	Barrick Gold Corporation
City	Preissac
Province	Quebec
Region	Quebec
Latitude/Longitude	48 15 N / 78 29 W
Sector	Precious metals
Product	Gold-Copper
Regulatory Status	Regulations
Effluent Discharge Point	
Comments	Discharged in March (1 day), April, May (1 week) and December

Parameters		Limits	January	February	March	April	May	June	July	August	Sep.	Oct.	Nov.	Dec.
Flow	(m^3/d)	-	0	0	12	14	12	0	0	0	0	0	0	-
TSM	(mg/L)	25	-	-	1.000	1.000	2.000	-	-	-	-	-	-	3.800
As	(mg/L)	0.5	-	-	0.010	0.010	0.010	-	-	-	-	-	-	0.002
Cu	(mg/L)	0.3	-	-	0.010	0.030	0.040	-	-	-	-	-	-	0.020
Ni	(mg/L)	0.5	-	-	0.040	0.050	0.040	-	-	-	-	-	-	0.040
Pb	(mg/L)	0.2	-	-	0.010	0.010	0.010	-	-	-	-	-	-	0.010
Zn	(mg/L)	0.5	-	-	0.090	0.080	0.070	-	-	-	-	-	-	0.110
Ra-226	(pCi/L)	10	-	-	-	-	-	-	-	-	-	-	-	-
pH		>6.0	-	-	7.4	7.4	7.1	-	-	-	-	-	-	7.3

Metal Mining Liquid Effluent Regulations (MMLER) & Guidelines (MMLEG)

Monthly Average Effluent Quality Data

Mine/Mill Name	Brunswick #12
Company Name	NORANDA MINING AND EXPLORATION INC.
Operator Name	Noranda Mining and Exploration Inc.
City	Bathurst
Province	New Brunswick
Region	Atlantic
Latitude/Longitude	47 28 N / 65 53 W
Sector	Base metals
Product	Lead-Zinc-Copper-Silver
Regulatory Status	Guidelines
Effluent Discharge Point	Effluent into Little River
Comments	

Parameters	Limits	January	February	March	April	May	June	July	August	Sep.	Oct.	Nov.	Dec.
Flow (m^3/month)	-	580000	740000	2220000	2260000	1230000	1260000	1700000	520000	1180000	1450000	1500000	1030000
TSM (mg/L)	25	1.600	1.700	1.900	2.000	3.800	3.200	2.000	1.500	3.600	4.400	4.200	5.300
As (mg/L)	0.5	-	-	-	-	-	-	-	-	-	-	-	-
Cu (mg/L)	0.3	0.010	0.010	0.010	-	-	0.020	0.020	0.010	0.010	0.010	0.020	0.010
Ni (mg/L)	0.5	-	-	-	-	-	-	-	-	-	-	-	-
Pb (mg/L)	0.2	0.010	0.010	0.010	-	-	0.010	0.010	0.010	0.010	0.010	0.010	0.010
Zn (mg/L)	0.5	0.070	0.080	0.300	0.500	0.200	0.430	0.220	0.230	0.260	0.250	0.370	0.380
Ra-226 (pCi/L)	10	-	-	-	-	-	-	-	-	-	-	-	-
pH	>6.0	9.2	9.3	9.2	9.0	9.0	9.3	9.2	8.9	9.0	8.7	8.8	9.0

Metal Mining Liquid Effluent Regulations (MMLER) & Guidelines (MMLEG)

Monthly Average Effluent Quality Data

Mine/Mill Name	Caribou
Company Name	CANZINCO LTD
Operator Name	CanZinco Ltd.
City	50 km West of Bathurst
Province	New Brunswick
Region	Atlantic
Latitude/Longitude	47 34 N / 66 17 W
Sector	Base metals
Product	Zinc-Lead-Silver
Regulatory Status	Regulations
Effluent Discharge Point	Polishing Pond Discharge
Comments	Mine was shut down August 2, 1998

Parameters	Limits	January	February	March	April	May	June	July	August	Sep.	Oct.	Nov.	Dec.
Flow (m^3/month)	-	91000	76000	460000	840000	520000	140000	180000	-	-	-	-	-
TSM (mg/L)	25	3.300	4.700	4.300	3.800	3.300	4.400	5.400	-	-	-	-	-
As (mg/L)	0.5	0.004	0.005	0.005	0.006	0.009	0.009	0.015	-	-	-	-	-
Cu (mg/L)	0.3	0.058	0.053	0.111	0.122	0.096	0.107	0.155	-	-	-	-	-
Ni (mg/L)	0.5	-	-	-	-	-	-	-	-	-	-	-	-
Pb (mg/L)	0.2	0.050	0.036	0.046	0.045	0.113	0.192	**0.334**	-	-	-	-	-
Zn (mg/L)	0.5	0.236	0.072	0.083	0.083	0.101	0.175	0.267	-	-	-	-	-
Ra-226 (pCi/L)	10	-	-	-	-	-	-	-	-	-	-	-	-
pH	>6.0	7.4	8.0	8.2	7.4	7.2	7.2	8.0	-	-	-	-	-

Boxed data indicates that a monthly effluent quality standard (MEQS) was exceeded for that month.

Metal Mining Liquid Effluent Regulations (MMLER) & Guidelines (MMLEG)

Monthly Average Effluent Quality Data

Mine/Mill Name	Cluff Lake
Company Name	COGEMA RESOURCES INC.
Operator Name	Cogema Resources Inc.
City	Saskatoon
Province	Saskatchewan
Region	Prairie and Northern
Latitude/Longitude	58 23 N / 109 32 W
Sector	Uranium
Product	Uranium
Regulatory Status	Regulations
Effluent Discharge Point	Treated Effluent
Comments	

Parameters	Limits	January	February	March	April	May	June	July	August	Sep.	Oct.	Nov.	Dec.
Flow (m^3/month)	-	92129	95526	112284	192088	175929	134752	177382	151110	64029	102689	98515	84954
TSM (mg/L)	25	4.000	5.000	4.000	3.000	3.000	3.000	2.200	3.000	3.000	3.000	3.000	4.400
As (mg/L)	0.5	0.002	0.004	0.006	0.003	0.003	0.002	0.003	0.001	0.005	0.002	0.002	0.004
Cu (mg/L)	0.3	0.004	0.007	0.001	0.002	0.007	0.001	0.003	0.001	0.001	0.002	0.006	0.001
Ni (mg/L)	0.5	0.014	0.019	0.011	0.010	0.011	0.010	0.011	0.011	0.014	0.012	0.021	0.017
Pb (mg/L)	0.2	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002
Zn (mg/L)	0.5	0.007	0.011	0.005	0.008	0.005	0.008	0.008	0.007	0.006	0.008	0.010	0.010
Ra-226 (pCi/L)	10	0.240	0.540	0.570	0.550	0.240	0.160	0.140	0.190	0.140	0.140	0.380	0.350
pH	>6.0	7.2	7.3	7.1	7.2	7.4	7.2	7.1	7.2	7.2	7.0	7.2	7.3

Metal Mining Liquid Effluent Regulations (MMLER) & Guidelines (MMLEG)

Monthly Average Effluent Quality Data

Mine/Mill Name	Copper Cliff Treatment Plant
Company Name	INCO LIMITED
Operator Name	INCO Limited
City	Copper Cliff
Province	Ontario
Region	Ontario
Latitude/Longitude	46 30 N / 81 00 W
Sector	Base metals
Product	Nickel-Copper-Cobalt-Platinum
Regulatory Status	Guidelines
Effluent Discharge Point	
Comments	

Parameters		Limits	January	February	March	April	May	June	July	August	Sep.	Oct.	Nov.	Dec.
Flow	(m^3/d)	-	76180	38220	69020	114700	102600	114800	49250	46260	44470	49280	57780	68210
TSM	(mg/L)	25	3.700	3.700	3.500	3.100	3.100	3.000	3.700	3.000	3.500	3.200	5.100	3.300
As	(mg/L)	0.5	0.001	0.001	0.002	0.002	0.009	0.010	-	-	-	-	-	-
Cu	(mg/L)	0.3	0.040	0.030	0.040	0.100	0.070	0.040	0.040	0.020	0.027	0.034	0.035	0.065
Ni	(mg/L)	0.5	0.370	0.190	0.266	0.235	0.170	0.110	0.035	0.114	0.234	0.322	0.201	0.331
Pb	(mg/L)	0.2	0.015	0.015	0.015	0.022	0.018	0.040	0.015	0.027	0.030	0.030	0.030	0.030
Zn	(mg/L)	0.5	0.006	0.006	0.006	0.009	0.009	0.009	0.013	0.009	0.009	0.009	0.009	0.009
Ra-226	(pCi/L)	10	-	-	-	-	-	-	-	-	-	-	-	-
pH		>6.0	8.5	8.2	8.0	8.6	8.1	8.1	8.3	8.0	9.0	8.0	7.8	8.5

Metal Mining Liquid Effluent Regulations (MMLER) & Guidelines (MMLEG)

1998 Monthly Average Data Quality of mining Effluents

Mine/Mill Name	Craigmont
Company Name	CRAIGMONT MINES LTD.
Operator Name	Craigmont Mines Ltd.
City	Meritt
Province	British Columbia
Region	Pacific and Yukon
Latitude/Longitude	50 12 N / 150 55 W
Sector	Base metals
Product	Magnetite
Regulatory Status	Regulations
Effluent Discharge Point	
Comments	No surface effluent

Parameters	Limits	January	February	March	April	May	June	July	August	Sep.	Oct.	Nov.	Dec.
Flow (m^3/month)	-	-	-	-	-	-	-	-	-	-	-	-	-
TSM (mg/L)	25	-	-	-	-	-	-	-	-	-	-	-	-
As (mg/L)	0.5	-	-	-	-	-	-	-	-	-	-	-	-
Cu (mg/L)	0.3	-	-	-	-	-	-	-	-	-	-	-	-
Ni (mg/L)	0.5	-	-	-	-	-	-	-	-	-	-	-	-
Pb (mg/L)	0.2	-	-	-	-	-	-	-	-	-	-	-	-
Zn (mg/L)	0.5	-	-	-	-	-	-	-	-	-	-	-	-
Ra-226 (pCi/L)	10	-	-	-	-	-	-	-	-	-	-	-	-
pH	>6.0	-	-	-	-	-	-	-	-	-	-	-	-

Metal Mining Liquid Effluent Regulations (MMLER) & Guidelines (MMLEG)

Monthly Average Effluent Quality Data

Mine/Mill Name	Crean Hill
Company Name	INCO LIMITED
Operator Name	INCO Limited
City	Copper Cliff
Province	Ontario
Region	Ontario
Latitude/Longitude	46 25 N / 81 21 W
Sector	Base metals
Product	Nickel-Copper-Cobalt-Platinum
Regulatory Status	Guidelines
Effluent Discharge Point	
Comments	

Parameters		Limits	January	February	March	April	May	June	July	August	Sep.	Oct.	Nov.	Dec.
Flow	(m^3/d)	-	1014	792	8155	3984	598	1920	309	656	840	1581	1961	1905
TSM	(mg/L)	25	3.200	3.100	5.300	3.500	2.500	2.500	2.400	2.400	2.800	3.700	2.900	3.100
As	(mg/L)	0.5	0.001	0.001	0.001	0.007	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
Cu	(mg/L)	0.3	0.006	0.006	0.013	0.007	0.005	0.003	0.003	0.002	0.004	0.006	0.006	0.006
Ni	(mg/L)	0.5	0.418	0.301	0.328	0.307	0.052	0.103	0.102	0.127	0.128	0.210	0.417	**0.516**
Pb	(mg/L)	0.2	0.015	0.015	0.015	0.015	0.013	0.005	0.002	0.002	0.002	0.002	0.002	0.002
Zn	(mg/L)	0.5	0.006	0.006	0.007	0.006	0.011	0.009	0.006	0.005	0.005	0.008	0.004	0.007
Ra-226	(pCi/L)	10	-	-	-	-	-	-	-	-	-	-	-	-
pH		>6.0	8.1	7.6	8.4	8.5	8.5	8.2	8.2	8.0	8.2	8.1	8.1	8.0

Boxed data indicates that a monthly effluent quality standard (MEQS) was exceeded for that month.

Metal Mining Liquid Effluent Regulations (MMLER) & Guidelines (MMLEG)

1998 Monthly Average Data Quality of mining Effluents

Mine/Mill Name	Endako
Company Name	THOMPSON CREEK MINING COMPANY
Operator Name	Thompson Creek Mining Company
City	Endako
Province	British Columbia
Region	Pacific and Yukon
Latitude/Longitude	54 02 N / 125 06 W
Sector	Base metals
Product	Molybdenum
Regulatory Status	Guidelines
Effluent Discharge Point	
Comments	Data not available

Parameters	Limits	January	February	March	April	May	June	July	August	Sep.	Oct.	Nov.	Dec.
Flow (m^3/month)	-	-	-	-	-	-	-	-	-	-	-	-	-
TSM (mg/L)	25	-	-	-	-	-	-	-	-	-	-	-	-
As (mg/L)	0.5	-	-	-	-	-	-	-	-	-	-	-	-
Cu (mg/L)	0.3	-	-	-	-	-	-	-	-	-	-	-	-
Ni (mg/L)	0.5	-	-	-	-	-	-	-	-	-	-	-	-
Pb (mg/L)	0.2	-	-	-	-	-	-	-	-	-	-	-	-
Zn (mg/L)	0.5	-	-	-	-	-	-	-	-	-	-	-	-
Ra-226 (pCi/L)	10	-	-	-	-	-	-	-	-	-	-	-	-
pH	>6.0	-	-	-	-	-	-	-	-	-	-	-	-

Metal Mining Liquid Effluent Regulations (MMLER) & Guidelines (MMLEG)

Monthly Average Effluent Quality Data

Mine/Mill Name	Eskay Creek
Company Name	PRIME RESOURCES GROUP INC.
Operator Name	Homestake Canada Inc.
City	83 km North of Stewart
Province	British Columbia
Region	Pacific and Yukon
Latitude/Longitude	56 39 N / 30 27 W
Sector	Precious metals
Product	Gold-Silver
Regulatory Status	Regulations
Effluent Discharge Point	D3
Comments	

Parameters	Limits	January	February	March	April	May	June	July	August	Sep.	Oct.	Nov.	Dec.
Flow (m^3/month)	-	-	-	-	-	-	-	-	-	-	-	-	-
TSM (mg/L)	25	4.700	4.000	-	8.000	3.000	5.000	9.000	-	1.700	9.800	3.400	3.500
As (mg/L)	0.5	0.004	0.004	-	0.003	0.002	0.003	0.018	-	0.005	0.003	0.005	0.003
Cu (mg/L)	0.3	0.006	0.003	-	0.005	0.005	0.004	0.008	-	0.003	0.003	0.001	0.001
Ni (mg/L)	0.5	0.006	0.003	-	0.004	0.002	0.001	0.003	-	0.032	0.021	0.030	0.035
Pb (mg/L)	0.2	0.003	0.017	-	0.004	0.010	0.007	0.011	-	0.003	0.006	0.001	0.003
Zn (mg/L)	0.5	0.164	0.205	-	0.129	0.105	0.057	0.042	-	0.103	0.089	0.076	0.058
Ra-226 (pCi/L)	10	-	-	-	-	-	-	-	-	-	-	-	-
pH	>6.0	8.1	7.2	-	7.8	7.4	7.5	9.6	-	7.4	7.1	7.2	7.0

Metal Mining Liquid Effluent Regulations (MMLER) & Guidelines (MMLEG)

Monthly Average Effluent Quality Data

Mine/Mill Name	Eskay Creek
Company Name	PRIME RESOURCES GROUP INC.
Operator Name	Homestake Canada Inc.
City	83 km North of Stewart
Province	British Columbia
Region	Pacific and Yukon
Latitude/Longitude	56 39 N / 30 27 W
Sector	Precious metals
Product	Gold-Silver
Regulatory Status	Regulations
Effluent Discharge Point	D7
Comments	

Parameters	Limits	January	February	March	April	May	June	July	August	Sep.	Oct.	Nov.	Dec.
Flow (m^3/month)	-	-	-	-	-	-	-	-	-	-	-	-	-
TSM (mg/L)	25	14.700	17.000	19.000	21.000	16.400	25.000	20.000	20.200	15.400	22.700	11.200	20.200
As (mg/L)	0.5	0.015	0.002	0.003	0.004	0.003	0.003	0.008	0.005	0.004	0.003	0.003	0.002
Cu (mg/L)	0.3	0.004	0.003	0.001	0.004	0.001	0.002	0.001	0.011	0.004	0.008	0.026	0.005
Ni (mg/L)	0.5	0.005	0.005	0.003	0.004	0.003	0.004	0.005	0.005	0.004	0.004	0.004	0.003
Pb (mg/L)	0.2	0.074	0.059	0.037	0.080	0.065	0.051	0.013	0.050	0.056	0.042	0.045	0.050
Zn (mg/L)	0.5	0.064	0.042	0.030	0.041	0.040	0.035	0.030	0.027	0.020	0.028	0.020	0.020
Ra-226 (pCi/L)	10	-	-	-	-	-	-	-	-	-	-	-	-
pH	>6.0	7.7	7.9	7.9	7.9	7.8	7.5	7.8	7.8	7.8	7.8	7.6	7.6

Metal Mining Liquid Effluent Regulations (MMLER) & Guidelines (MMLEG)

Monthly Average Effluent Quality Data

Mine/Mill Name	Eskay Creek
Company Name	PRIME RESOURCES GROUP INC.
Operator Name	Homestake Canada Inc.
City	83 km North of Stewart
Province	British Columbia
Region	Pacific and Yukon
Latitude/Longitude	56 39 N / 30 27 W
Sector	Precious metals
Product	Gold-Silver
Regulatory Status	Regulations
Effluent Discharge Point	W20
Comments	

Parameters	Limits	January	February	March	April	May	June	July	August	Sep.	Oct.	Nov.	Dec.
Flow (m^3/month)	-	-	-	-	-	-	-	-	-	-	-	-	-
TSM (mg/L)	25	1.300	1.600	1.600	2.300	2.200	1.800	1.600	5.000	16.000	19.800	7.200	2.000
As (mg/L)	0.5	0.009	0.009	0.010	0.011	0.006	0.007	0.007	0.008	0.013	0.015	0.013	0.011
Cu (mg/L)	0.3	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.004	0.003	0.001	0.001
Ni (mg/L)	0.5	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.002	0.001	0.001	0.001
Pb (mg/L)	0.2	0.007	0.005	0.004	0.005	0.005	0.010	0.005	0.018	0.070	0.090	0.040	0.010
Zn (mg/L)	0.5	0.005	0.005	0.005	0.008	0.007	0.015	0.005	0.010	0.048	0.073	0.026	0.008
Ra-226 (pCi/L)	10	-	-	-	-	-	-	-	-	-	-	-	-
pH	>6.0	8.0	7.9	8.2	7.9	7.2	8.1	7.6	7.5	7.6	7.6	7.8	7.5

Metal Mining Liquid Effluent Regulations (MMLER) & Guidelines (MMLEG)

Monthly Average Effluent Quality Data

Mine/Mill Name	Flin Flon Mill
Company Name	HUDSON BAY MINING AND SMELTING CO., LTD
Operator Name	Hudson Bay Mining and Smelting Co. Ltd
City	Flin Flon
Province	Manitoba
Region	Prairie and Northern
Latitude/Longitude	54 46 N /101 53 W
Sector	Base metals
Product	Copper-Lead-Zinc
Regulatory Status	Guidelines
Effluent Discharge Point	Tailings Pond North Weir
Comments	

Parameters	Limits	January	February	March	April	May	June	July	August	Sep.	Oct.	Nov.	Dec.
Flow (m^3/month)	-	451000	871800	1011000	1468700	1287500	1510400	874500	1100200	1037500	1428400	918000	852500
TSM (mg/L)	25	7.750	5.000	5.600	5.250	9.500	6.400	7.000	6.500	8.400	5.500	4.750	5.200
As (mg/L)	0.5	0.008	0.011	0.020	0.008	0.002	0.002	0.001	0.004	0.002	0.004	0.010	0.013
Cu (mg/L)	0.3	0.020	0.010	0.016	0.010	0.010	0.012	0.010	0.010	0.010	0.010	0.010	0.012
Ni (mg/L)	0.5	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
Pb (mg/L)	0.2	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040
Zn (mg/L)	0.5	0.113	0.070	0.038	0.153	0.365	0.332	0.448	0.358	0.346	0.438	0.355	0.142
Ra-226 (pCi/L)	10	-	-	-	-	-	-	-	-	-	-	-	-
pH	>6.0	9.9	9.8	10.5	9.9	10.9	10.2	10.4	10.3	10.1	9.5	10.2	10.7

Metal Mining Liquid Effluent Regulations (MMLER) & Guidelines (MMLEG)

Monthly Average Effluent Quality Data

Mine/Mill Name	Francoeur
Company Name	RICHMONT MINES INC.
Operator Name	Richmont Mines Inc.
City	Rouyn-Noranda
Province	Quebec
Region	Quebec
Latitude/Longitude	48 13 N / 79 17 W
Sector	Precious metals
Product	Gold
Regulatory Status	Regulations
Effluent Discharge Point	Settling Pond Discharge
Comments	

Parameters		Limits	January	February	March	April	May	June	July	August	Sep.	Oct.	Nov.	Dec.
Flow	(m^3/d)	-	1187	1159	1188	1305	1242	1256	1221	1159	1166	1264	1271	1361
TSM	(mg/L)	25	9.000	9.000	8.000	7.000	7.000	9.000	6.000	7.000	7.000	13.000	15.000	18.000
As	(mg/L)	0.5	-	-	-	0.010	-	-	-	-	-	0.010	-	-
Cu	(mg/L)	0.3	-	-	-	0.010	-	-	-	-	-	0.020	-	-
Ni	(mg/L)	0.5	-	-	-	0.040	-	-	-	-	-	0.070	-	-
Pb	(mg/L)	0.2	-	-	-	0.010	-	-	-	-	-	0.040	-	-
Zn	(mg/L)	0.5	-	-	-	0.020	-	-	-	-	-	0.010	-	-
Ra-226	(pCi/L)	10	-	-	-	-	-	-	-	-	-	-	-	-
pH		>6.0	7.9	7.9	7.9	7.8	7.8	7.8	7.8	7.6	7.6	7.7	7.4	7.7

Metal Mining Liquid Effluent Regulations (MMLER) & Guidelines (MMLEG)

Monthly Average Effluent Quality Data

Mine/Mill Name	Garson
Company Name	INCO LIMITED
Operator Name	INCO Limited
City	Copper Cliff
Province	Ontario
Region	Ontario
Latitude/Longitude	46 25 N / 81 21 W
Sector	Base metals
Product	Nickel-Copper-Cobalt-Platinum
Regulatory Status	Guidelines
Effluent Discharge Point	
Comments	

Parameters		Limits	January	February	March	April	May	June	July	August	Sep.	Oct.	Nov.	Dec.
Flow	(m^3/d)		2891	2981	5056	4445	3260	2857	1890	1938	1978	2158	2371	2227
TSM	(mg/L)	25	10.900	14.300	4.000	5.500	14.600	3.100	2.800	3.800	5.800	4.100	5.500	15.900
As	(mg/L)	0.5	0.001	0.001	0.001	0.001	0.007	0.008	0.010	0.010	0.010	0.010	0.010	0.010
Cu	(mg/L)	0.3	0.006	0.006	0.026	0.009	0.004	0.003	0.002	0.003	0.003	0.013	0.038	0.028
Ni	(mg/L)	0.5	0.090	0.089	**0.777**	0.260	0.070	0.100	0.040	0.200	0.480	**1.802**	0.247	0.080
Pb	(mg/L)	0.2	0.014	0.015	0.015	0.017	0.005	0.003	0.002	0.002	0.004	0.003	0.002	-
Zn	(mg/L)	0.5	0.006	0.009	0.006	0.018	0.006	0.006	0.008	0.009	0.006	0.006	0.006	-
Ra-226	(pCi/L)	10	-	-	-	-	-	-	-	-	-	-	-	-
pH		>6.0	8.5	8.4	7.4	7.6	8.1	8.0	7.6	8.3	8.3	7.7	8.3	8.6

Boxed data indicates that a monthly effluent quality standard (MEQS) was exceeded for that month.

Metal Mining Liquid Effluent Regulations (MMLER) & Guidelines (MMLEG)

Monthly Average Effluent Quality Data

Mine/Mill Name	Gaspé Copper
Company Name	NORANDA MINING AND EXPLORATION INC.
Operator Name	Noranda Mining and Exploration Inc.
City	Murdochville
Province	Quebec
Region	Quebec
Latitude/Longitude	48 58 N / 65 31 W
Sector	Base metals
Product	Copper
Regulatory Status	Guidelines
Effluent Discharge Point	Combined Effluent
Comments	

Parameters		Limits	January	February	March	April	May	June	July	August	Sep.	Oct.	Nov.	Dec.
Flow	(m^3/d)	-	19200	19920	47520	119520	288000	156000	60000	27600	60000	84000	64800	28800
TSM	(mg/L)	25	1.900	1.400	2.600	1.600	2.500	2.100	2.000	2.100	1.100	2.200	2.200	1.700
As	(mg/L)	0.5	-	-	-	-	-	-	-	-	-	-	-	0.002
Cu	(mg/L)	0.3	0.030	0.020	0.090	0.050	0.050	0.030	0.030	0.020	0.030	0.030	0.070	0.040
Ni	(mg/L)	0.5	0.020	0.030	0.020	0.020	0.020	0.010	0.010	0.010	0.022	0.010	0.010	0.020
Pb	(mg/L)	0.2	0.050	0.050	0.040	0.040	0.030	0.020	0.030	0.030	0.026	0.014	0.020	0.030
Zn	(mg/L)	0.5	0.020	0.020	0.030	0.027	0.160	0.010	0.010	0.010	0.012	0.010	0.010	0.020
Ra-226	(pCi/L)	10	-	-	-	-	-	-	-	-	-	-	-	-
pH		>6.0	7.5	7.4	7.4	7.5	7.8	8.2	7.7	8.0	7.9	7.8	7.8	7.6

Metal Mining Liquid Effluent Regulations (MMLER) & Guidelines (MMLEG)

Monthly Average Effluent Quality Data

Mine/Mill Name	Gibraltar
Company Name	WESTMIN RESOURCES LIMITED
Operator Name	Westmin Resources Limited
City	McLeese Lake
Province	British Columbia
Region	Pacific and Yukon
Latitude/Longitude	52 31 N / 122 17 W
Sector	Base metals
Product	Copper
Regulatory Status	Guidelines
Effluent Discharge Point	
Comments	Data not available.

Parameters	Limits	January	February	March	April	May	June	July	August	Sep.	Oct.	Nov.	Dec.
Flow (m^3/month)	-	-	-	-	-	-	-	-	-	-	-	-	-
TSM (mg/L)	25	-	-	-	-	-	-	-	-	-	-	-	-
As (mg/L)	0.5	-	-	-	-	-	-	-	-	-	-	-	-
Cu (mg/L)	0.3	-	-	-	-	-	-	-	-	-	-	-	-
Ni (mg/L)	0.5	-	-	-	-	-	-	-	-	-	-	-	-
Pb (mg/L)	0.2	-	-	-	-	-	-	-	-	-	-	-	-
Zn (mg/L)	0.5	-	-	-	-	-	-	-	-	-	-	-	-
Ra-226 (pCi/L)	10	-	-	-	-	-	-	-	-	-	-	-	-
pH	>6.0	-	-	-	-	-	-	-	-	-	-	-	-

Metal Mining Liquid Effluent Regulations (MMLER) & Guidelines (MMLEG)

Monthly Average Effluent Quality Data

Mine/Mill Name	Gonzague Langlois
Company Name	CAMBIOR INC.
Operator Name	Cambior Inc.
City	183 km North-East of Lebel-sur-Quévillon
Province	Quebec
Region	Quebec
Latitude/Longitude	49 15 N / 76 45 W
Sector	Base metals
Product	Zinc-Copper
Regulatory Status	Regulations
Effluent Discharge Point	Tailings Pond
Comments	

Parameters		Limits	January	February	March	April	May	June	July	August	Sep.	Oct.	Nov.	Dec.
Flow	(m^3/d)	-	1735	1735	2327	5904	353160	2333	4248	1146	984	5904	5826	349560
TSM	(mg/L)	25	3.700	1.000	0.800	3.500	2.600	6.700	8.600	8.300	5.500	6.200	8.000	4.800
As	(mg/L)	0.5	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.003	0.002
Cu	(mg/L)	0.3	0.040	0.050	0.060	0.040	0.020	0.030	0.020	0.030	0.040	0.030	0.020	0.020
Ni	(mg/L)	0.5	0.040	0.080	0.040	0.040	0.040	0.040	0.040	0.060	0.040	0.040	0.040	0.040
Pb	(mg/L)	0.2	0.010	0.020	0.020	0.020	0.010	0.010	0.010	0.010	0.020	0.010	0.020	0.010
Zn	(mg/L)	0.5	0.070	0.045	0.048	0.040	0.030	0.100	0.070	0.080	0.130	0.100	0.120	0.140
Ra-226	(pCi/L)	10	-	-	-	-	-	-	-	-	-	-	-	-
pH		>6.0	7.0	7.0	7.0	7.0	6.9	7.1	6.8	6.8	7.3	7.0	7.3	7.3

Metal Mining Liquid Effluent Regulations (MMLER) & Guidelines (MMLEG)

Monthly Average Effluent Quality Data

Mine/Mill Name	Gonzague Langlois
Company Name	CAMBIOR INC.
Operator Name	Cambior Inc.
City	183 km North-East of Lebel-sur-Quévillon
Province	Quebec
Region	Quebec
Latitude/Longitude	49 15 N / 76 45 W
Sector	Base metals
Product	Zinc-Copper
Regulatory Status	Regulations
Effluent Discharge Point	Ditch 3A
Comments	

Parameters		Limits	January	February	March	April	May	June	July	August	Sep.	Oct.	Nov.	Dec.
Flow	(m^3/d)	-	-	-	-	6	12	12	24	18	35	24	37	-
TSM	(mg/L)	25	-	-	-	4.900	2.800	4.100	10.300	6.600	6.300	3.300	10.500	7.600
As	(mg/L)	0.5	-	-	-	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.002	0.002
Cu	(mg/L)	0.3	-	-	-	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
Ni	(mg/L)	0.5	-	-	-	0.050	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040
Pb	(mg/L)	0.2	-	-	-	0.030	0.010	0.010	0.010	0.010	0.030	0.010	0.010	0.010
Zn	(mg/L)	0.5	-	-	-	0.030	0.030	0.010	0.020	0.010	0.020	0.010	0.010	0.040
Ra-226	(pCi/L)	10	-	-	-	-	-	-	-	-	-	-	-	-
pH		>6.0	-	-	-	7.6	7.3	7.4	7.3	7.3	7.0	7.0	7.2	7.5

Metal Mining Liquid Effluent Regulations (MMLER) & Guidelines (MMLEG)

Monthly Average Effluent Quality Data

Mine/Mill Name	Gonzague Langlois
Company Name	CAMBIOR INC.
Operator Name	Cambior Inc.
City	183 km North-East of Lebel-sur-Quévillon
Province	Quebec
Region	Quebec
Latitude/Longitude	49 15 N / 76 45 W
Sector	Base metals
Product	Zinc-Copper
Regulatory Status	Regulations
Effluent Discharge Point	Ditch 3C
Comments	

Parameters		Limits	January	February	March	April	May	June	July	August	Sep.	Oct.	Nov.	Dec.
Flow	(m^3/d)	-	-	-	-	-	-	-	374	340	350	367	346	288
TSM	(mg/L)	25	2.600	1.600	1.500	1.200	1.400	2.000	3.600	7.100	3.400	1.700	5.800	2.700
As	(mg/L)	0.5	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.002	0.002
Cu	(mg/L)	0.3	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.020	0.010	0.010	0.010
Ni	(mg/L)	0.5	0.040	0.060	0.040	0.040	0.040	0.040	0.040	0.050	0.040	0.040	0.040	0.040
Pb	(mg/L)	0.2	0.010	0.010	0.010	0.070	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
Zn	(mg/L)	0.5	0.010	0.010	0.010	0.030	0.020	0.010	0.320	0.010	0.010	0.020	0.016	0.020
Ra-226	(pCi/L)	10	-	-	-	-	-	-	-	-	-	-	-	-
pH		>6.0	7.5	7.4	7.4	7.4	7.4	7.4	7.4	7.4	7.0	7.1	7.2	7.4

Metal Mining Liquid Effluent Regulations (MMLER) & Guidelines (MMLEG)

Monthly Average Effluent Quality Data

Mine/Mill Name	Gonzague Langlois
Company Name	CAMBIOR INC.
Operator Name	Cambior Inc.
City	183 km North-East of Lebel-sur-Quévillon
Province	Quebec
Region	Quebec
Latitude/Longitude	49 15 N / 76 45 W
Sector	Base metals
Product	Zinc-Copper
Regulatory Status	Regulations
Effluent Discharge Point	Ditch 4
Comments	

Parameters		Limits	January	February	March	April	May	June	July	August	Sep.	Oct.	Nov.	Dec.
Flow	(m^3/d)	-	-	-	-	-	-	-	230	109	117	104	98	128
TSM	(mg/L)	25	11.100	1.700	1.700	14.200	1.700	2.300	5.300	3.600	5.500	3.400	8.200	5.500
As	(mg/L)	0.5	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.002	0.002
Cu	(mg/L)	0.3	0.010	0.010	0.010	0.010	0.030	0.010	0.010	0.010	0.010	0.010	0.020	0.002
Ni	(mg/L)	0.5	0.040	0.090	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.080
Pb	(mg/L)	0.2	0.010	0.010	0.020	0.030	0.010	0.010	0.010	0.010	0.010	0.010	0.002	0.030
Zn	(mg/L)	0.5	0.010	0.010	0.020	0.020	0.010	0.010	0.020	0.010	0.010	0.020	0.070	0.020
Ra-226	(pCi/L)	10	-	-	-	-	-	-	-	-	-	-	-	-
pH		>6.0	7.6	7.6	7.5	7.5	7.8	7.8	7.7	7.8	7.3	7.4	7.3	7.7

Metal Mining Liquid Effluent Regulations (MMLER) & Guidelines (MMLEG)

Monthly Average Effluent Quality Data

Mine/Mill Name	Heath Steele
Company Name	NORANDA MINING AND EXPLORATION INC.
Operator Name	Noranda Mining and Exploration Inc.
City	Miramichi
Province	New Brunswick
Region	Atlantic
Latitude/Longitude	47 17 N / 66 04 W
Sector	Base metals
Product	Lead-Zinc-Copper-Silver
Regulatory Status	Guidelines
Effluent Discharge Point	Tailings Pond Overflowed into South Tomogonops River
Comments	

Parameters	Limits	January	February	March	April	May	June	July	August	Sep.	Oct.	Nov.	Dec.
Flow (m^3/month)	-	150000	450000	1520000	2080000	2220000	1420000	1060000	780000	760000	720000	1040000	1010000
TSM (mg/L)	25	1.400	1.000	4.100	3.600	2.800	2.400	1.800	1.600	1.700	3.700	1.600	1.100
As (mg/L)	0.5	0.003	0.003	0.005	0.005	0.003	0.003	0.003	0.003	0.003	0.003	0.003	0.003
Cu (mg/L)	0.3	0.020	0.020	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
Ni (mg/L)	0.5	-	-	-	-	-	-	-	-	-	-	-	-
Pb (mg/L)	0.2	0.010	0.010	0.030	0.020	0.010	0.010	0.010	0.010	0.010	0.020	0.010	0.010
Zn (mg/L)	0.5	0.007	0.080	0.070	0.180	0.120	0.070	0.060	0.050	0.070	0.080	0.060	0.030
Ra-226 (pCi/L)	10	-	-	-	-	-	-	-	-	-	-	-	-
pH	>6.0	7.2	7.0	9.6	10.0	9.3	9.4	9.5	9.6	9.3	9.4	10.1	10.6

Metal Mining Liquid Effluent Regulations (MMLER) & Guidelines (MMLEG)

Monthly Average Effluent Quality Data

Mine/Mill Name	Highland Valley Copper
Company Name	COMINCO LTD.
Operator Name	Highland Valley Copper
City	Logan Lake
Province	British Columbia
Region	Pacific and Yukon
Latitude/Longitude	48 31 N / 79 45 W
Sector	Base metals
Product	Copper-Molybdenum
Regulatory Status	Regulations
Effluent Discharge Point	Bose Lake Discharge
Comments	No discharge for February, July, November and December

Parameters	Limits	January	February	March	April	May	June	July	August	Sep.	Oct.	Nov.	Dec.
Flow (m^3/month)	-	-	-	-	-	-	-	-	-	-	-	-	-
TSM (mg/L)	25	-	-	-	-	-	-	-	-	-	-	-	-
As (mg/L)	0.5	-	-	-	-	-	-	-	-	-	-	-	-
Cu (mg/L)	0.3	0.001	-	0.021	0.021	0.001	0.001	-	0.006	0.001	0.002	-	-
Ni (mg/L)	0.5	-	-	-	-	-	-	-	-	-	-	-	-
Pb (mg/L)	0.2	-	-	-	-	-	-	-	-	-	-	-	-
Zn (mg/L)	0.5	0.005	-	0.005	0.054	0.010	0.005	-	0.005	0.005	0.005	-	-
Ra-226 (pCi/L)	10	-	-	-	-	-	-	-	-	-	-	-	-
pH	>6.0	6.9	-	6.9	6.6	6.7	7.1	-	7.1	7.1	7.1	-	-

Metal Mining Liquid Effluent Regulations (MMLER) & Guidelines (MMLEG)

Monthly Average Effluent Quality Data

Mine/Mill Name	Highland Valley Copper
Company Name	COMINCO LTD.
Operator Name	Highland Valley Copper
City	Logan Lake
Province	British Columbia
Region	Pacific and Yukon
Latitude/Longitude	48 31 N / 79 45 W
Sector	Base metals
Product	Copper-Molybdenum
Regulatory Status	Regulations
Effluent Discharge Point	Pukaist Creek Discharge
Comments	No discharge for January, February, November and December

Parameters	Limits	January	February	March	April	May	June	July	August	Sep.	Oct.	Nov.	Dec.
Flow (m^3/month)	-	-	-	-	-	-	-	-	-	-	-	-	-
TSM (mg/L)	25	-	-	1.000	1.000	1.000	1.000	5.000	1.000	1.000	2.000	-	-
As (mg/L)	0.5	-	-	-	-	-	-	-	-	-	-	-	-
Cu (mg/L)	0.3	-	-	0.001	0.002	0.002	0.001	0.001	0.001	0.001	0.001	-	-
Ni (mg/L)	0.5	-	-	-	-	-	-	-	-	-	-	-	-
Pb (mg/L)	0.2	-	-	-	-	-	-	-	-	-	-	-	-
Zn (mg/L)	0.5	-	-	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	-	-
Ra-226 (pCi/L)	10	-	-	-	-	-	-	-	-	-	-	-	-
pH	>6.0	-	-	7.9	7.7	8.2	8.2	8.2	8.2	8.1	8.1	-	-

Metal Mining Liquid Effluent Regulations (MMLER) & Guidelines (MMLEG)

Monthly Average Effluent Quality Data

Mine/Mill Name	Highland Valley Copper
Company Name	COMINCO LTD.
Operator Name	Highland Valley Copper
City	Logan Lake
Province	British Columbia
Region	Pacific and Yukon
Latitude/Longitude	48 31 N / 79 45 W
Sector	Base metals
Product	Copper-Molybdenum
Regulatory Status	Regulations
Effluent Discharge Point	Trojan Creek Discharge
Comments	No discharge for April and May

Parameters	Limits	January	February	March	April	May	June	July	August	Sep.	Oct.	Nov.	Dec.
Flow (m^3/month)	-	-	-	-	-	-	-	-	-	-	-	-	-
TSM (mg/L)	25	5.000	3.000	4.000	-	-	0.001	3.000	3.000	3.000	1.000	2.000	5.000
As (mg/L)	0.5	-	-	-	-	-	-	-	-	-	-	-	-
Cu (mg/L)	0.3	0.005	0.008	0.014	-	-	0.025	0.010	0.010	0.008	0.009	0.004	0.010
Ni (mg/L)	0.5	-	-	-	-	-	-	-	-	-	-	-	-
Pb (mg/L)	0.2	-	-	-	-	-	-	-	-	-	-	-	-
Zn (mg/L)	0.5	0.005	0.005	0.005	-	-	0.005	0.005	0.005	0.005	0.005	0.005	0.005
Ra-226 (pCi/L)	10	-	-	-	-	-	-	-	-	-	-	-	-
pH	>6.0	8.0	8.1	8.1	-	-	8.8	8.7	8.5	8.4	8.1	8.2	8.3

Metal Mining Liquid Effluent Regulations (MMLER) & Guidelines (MMLEG)

Monthly Average Effluent Quality Data

Mine/Mill Name	Highland Valley Copper
Company Name	COMINCO LTD.
Operator Name	Highland Valley Copper
City	Logan Lake
Province	British Columbia
Region	Pacific and Yukon
Latitude/Longitude	48 31 N / 79 45 W
Sector	Base metals
Product	Copper-Molybdenum
Regulatory Status	Regulations
Effluent Discharge Point	Witches Brook Discharge
Comments	No discharge for January, February, July, September and December - No As, Ni, Pb data

Parameters	Limits	January	February	March	April	May	June	July	August	Sep.	Oct.	Nov.	Dec.
Flow (m^3/month)	-	-	-	-	-	-	-	-	-	-	-	-	-
TSM (mg/L)	25	-	-	0.001	0.001	0.001	0.001	-	0.001	-	-	-	-
As (mg/L)	0.5	-	-	-	-	-	-	-	-	-	-	-	-
Cu (mg/L)	0.3	-	-	0.003	0.002	0.005	0.003	-	0.001	-	0.001	-	-
Ni (mg/L)	0.5	-	-	-	-	-	-	-	-	-	-	-	-
Pb (mg/L)	0.2	-	-	-	-	-	-	-	-	-	-	0.005	-
Zn (mg/L)	0.5	-	-	0.005	0.005	0.005	0.005	-	0.001	-	-	0.001	-
Ra-226 (pCi/L)	10	-	-	-	-	-	-	-	-	-	-	-	-
pH	>6.0	-	-	7.5	7.4	7.2	7.8	-	7.6	-	-	7.6	-

Metal Mining Liquid Effluent Regulations (MMLER) & Guidelines (MMLEG)

Monthly Average Effluent Quality Data

Mine/Mill Name	Horne Division
Company Name	NORANDA MINING AND EXPLORATION INC.
Operator Name	Noranda Metallurgy Inc.
City	Rouyn-Noranda
Province	Quebec
Region	Quebec
Latitude/Longitude	48 15 N / 79 00 W
Sector	Base metals
Product	Copper
Regulatory Status	Guidelines
Effluent Discharge Point	#12
Comments	

Parameters	Limits	January	February	March	April	May	June	July	August	Sep.	Oct.	Nov.	Dec.
Flow (m^3/d)	-	48744	6864	74966	105948	34056	30643	48312	59789	129600	70488	39370	64368
TSM (mg/L)	25	3.500	4.300	20.400	8.000	2.500	1.800	2.300	2.400	1.500	6.500	4.600	3.800
As (mg/L)	0.5	0.050	0.050	0.050	0.040	0.050	0.050	0.050	0.040	0.050	0.050	0.050	0.050
Cu (mg/L)	0.3	0.090	0.080	0.070	0.140	0.040	0.130	0.060	0.070	0.090	0.090	0.060	0.280
Ni (mg/L)	0.5	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050
Pb (mg/L)	0.2	0.050	0.050	0.050	0.060	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050
Zn (mg/L)	0.5	0.100	0.190	0.110	0.370	0.050	0.060	0.090	0.100	0.220	0.105	0.120	**0.540**
Ra-226 (pCi/L)	10	-	-	-	-	-	-	-	-	-	-	-	-
pH	>6.0	8.6	8.5	8.6	8.2	8.0	7.9	7.8	7.8	7.7	8.6	7.7	8.0

Boxed data indicates that a monthly effluent quality standard (MEQS) was exceeded for that month.

Metal Mining Liquid Effluent Regulations (MMLER) & Guidelines (MMLEG)

Monthly Average Effluent Quality Data

Mine/Mill Name	Horne Division
Company Name	NORANDA MINING AND EXPLORATION INC.
Operator Name	Noranda Metallurgy Inc.
City	Rouyn-Noranda
Province	Quebec
Region	Quebec
Latitude/Longitude	48 15 N / 79 00 W
Sector	Base metals
Product	Copper
Regulatory Status	Guidelines
Effluent Discharge Point	PI-06
Comments	

Parameters		Limits	January	February	March	April	May	June	July	August	Sep.	Oct.	Nov.	Dec.
Flow	(m^3/d)	-	-	-	-	-	-	-	-	-	-	-	-	-
TSM	(mg/L)	25	2.800	8.000	3.800	8.500	10.800	3.600	1.800	7.000	14.800	4.000	7.600	7.800
As	(mg/L)	0.5	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050
Cu	(mg/L)	0.3	0.020	0.020	0.020	0.040	0.030	0.020	0.010	0.020	0.020	0.020	0.040	0.040
Ni	(mg/L)	0.5	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050
Pb	(mg/L)	0.2	0.050	0.050	0.050	0.050	0.040	0.042	0.040	0.050	0.050	0.050	0.040	0.050
Zn	(mg/L)	0.5	0.200	0.160	0.160	0.160	0.070	0.060	0.020	0.050	0.100	0.140	0.180	0.190
Ra-226	(pCi/L)	10	-	-	-	-	-	-	-	-	-	-	-	-
pH		>6.0	6.9	6.8	6.9	7.8	7.5	7.6	7.4	7.5	7.7	7.4	7.3	7.0

Metal Mining Liquid Effluent Regulations (MMLER) & Guidelines (MMLEG)

Monthly Average Effluent Quality Data

Mine/Mill Name	Hoyle Pond
Company Name	KINROSS GOLD CORPORATION
Operator Name	Kinross Gold Corporation
City	Schumacher
Province	Ontario
Region	Ontario
Latitude/Longitude	
Sector	Precious metals
Product	Gold
Regulatory Status	Regulations
Effluent Discharge Point	
Comments	No surface effluent

Parameters		Limits	January	February	March	April	May	June	July	August	Sep.	Oct.	Nov.	Dec.
Flow	(m^3/d)	-	-	-	-	-	-	-	-	-	-	-	-	-
TSM	(mg/L)	25	-	-	-	-	-	-	-	-	-	-	-	-
As	(mg/L)	0.5	-	-	-	-	-	-	-	-	-	-	-	-
Cu	(mg/L)	0.3	-	-	-	-	-	-	-	-	-	-	-	-
Ni	(mg/L)	0.5	-	-	-	-	-	-	-	-	-	-	-	-
Pb	(mg/L)	0.2	-	-	-	-	-	-	-	-	-	-	-	-
Zn	(mg/L)	0.5	-	-	-	-	-	-	-	-	-	-	-	-
Ra-226	(pCi/L)	10	-	-	-	-	-	-	-	-	-	-	-	-
pH		>6.0	-	-	-	-	-	-	-	-	-	-	-	-

Metal Mining Liquid Effluent Regulations (MMLER) & Guidelines (MMLEG)

Monthly Average Effluent Quality Data

Mine/Mill Name	Huckleberry
Company Name	PRINCETON MINING CORPORATION
Operator Name	Huckleberry Mines Ltd.
City	86 km Southwest of Houston, Omineca Division
Province	British Columbia
Region	Pacific and Yukon
Latitude/Longitude	53 41 N / 127 10 W
Sector	Base metals
Product	Copper-Molybdenum-Gold-Silver
Regulatory Status	Regulations
Effluent Discharge Point	SC-02
Comments	

Parameters	Limits	January	February	March	April	May	June	July	August	Sep.	Oct.	Nov.	Dec.
Flow (m^3/month)	-	4842	4374	1383	8958	7204	-	-	-	-	-	-	7347
TSM (mg/L)	25	3.000	6.000	1.000	2.000	6.000	1.000	1.000	1.000	5.000	12.000	9.000	6.000
As (mg/L)	0.5	0.001	0.000	0.000	0.001	0.001	0.001	0.000	0.000	0.000	0.001	0.000	0.000
Cu (mg/L)	0.3	0.001	0.009	0.005	0.009	0.030	0.004	0.002	0.002	0.002	0.005	0.001	0.001
Ni (mg/L)	0.5	-	-	-	-	-	-	-	-	-	-	-	-
Pb (mg/L)	0.2	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.010	0.001	0.001	0.010
Zn (mg/L)	0.5	0.001	0.006	0.005	0.006	0.005	0.008	0.005	0.005	0.005	0.005	0.005	0.005
Ra-226 (pCi/L)	10	-	-	-	-	-	-	-	-	-	-	-	-
pH	>6.0	6.4	6.6	6.4	7.3	7.6	7.6	7.8	7.8	7.7	7.5	7.4	7.6

Metal Mining Liquid Effluent Regulations (MMLER) & Guidelines (MMLEG)

Monthly Average Effluent Quality Data

Mine/Mill Name	Huckleberry
Company Name	PRINCETON MINING CORPORATION
Operator Name	Huckleberry Mines Ltd.
City	86 km SW of Houston, Omineca Division
Province	British Colombia
Region	Pacific and Yukon
Latitude/Longitude	53 41 N / 127 10 W
Sector	Base Metals
Product	Copper-Molybdenum-Gold-Silver
Regulatory Status	Regulations
Effluent Discharge Point	SC-02 Seep
Comments	Discharged only in April and May

Parameters	Limits	January	February	March	April	May	June	July	August	Sep.	Oct.	Nov.	Dec.
Flow (m^3/month)	-	-	-	-	-	-	-	-	-	-	-	-	-
TSM (mg/L)	25.0	-	-	-	1	4	-	-	-	-	-	-	-
As (mg/L)	0.5	-	-	-	0.0004	0.0007	-	-	-	-	-	-	-
Cu (mg/L)	0.3	-	-	-	0.001	0.001	-	-	-	-	-	-	-
Ni (mg/L)	0.5	-	-	-	-	-	-	-	-	-	-	-	-
Pb (mg/L)	0.2	-	-	-	0.001	0.001	-	-	-	-	-	-	-
Zn (mg/L)	0.5	-	-	-	0.008	0.013	-	-	-	-	-	-	-
Ra-226 (pCi/L)	10.0	-	-	-	-	-	-	-	-	-	-	-	-
pH	>6.0	-	-	-	6.8	7.3	-	-	-	-	-	-	-

Metal Mining Liquid Effluent Regulations (MMLER) & Guidelines (MMLEG)

Monthly Average Effluent Quality Data

Mine/Mill Name	Huckleberry
Company Name	PRINCETON MINING CORPORATION
Operator Name	Huckleberry Mines Ltd.
City	86 km Southwest of Houston, Omineca Division
Province	British Columbia
Region	Pacific and Yukon
Latitude/Longitude	53 41 N / 127 10 W
Sector	Base metals
Product	Copper-Molybdenum-Gold-Silver
Regulatory Status	Regulations
Effluent Discharge Point	SC-03
Comments	

Parameters	Limits	January	February	March	April	May	June	July	August	Sep.	Oct.	Nov.	Dec.
Flow (m^3/month)	-	9507	6462	2920	22506	11687	5022	2331	3884	801	5930	5022	2331
TSM (mg/L)	25	2.000	2.000	2.000	1.000	2.000	4.000	4.000	5.000	11.000	17.000	7.000	3.000
As (mg/L)	0.5	-	0.002	0.002	0.002	0.004	0.005	0.003	0.004	0.016	0.010	0.014	0.021
Cu (mg/L)	0.3	-	0.004	0.002	0.008	0.005	0.002	0.001	0.001	0.006	0.011	0.009	0.003
Ni (mg/L)	0.5	-	-	-	-	-	-	-	-	-	-	-	-
Pb (mg/L)	0.2	-	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Zn (mg/L)	0.5	-	0.006	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005
Ra-226 (pCi/L)	10	-	-	-	-	-	-	-	-	-	-	-	-
pH	>6.0	6.9	6.8	6.8	7.2	7.3	7.5	7.7	7.6	7.8	7.8	7.6	7.7

Metal Mining Liquid Effluent Regulations (MMLER) & Guidelines (MMLEG)

Monthly Average Effluent Quality Data

Mine/Mill Name	Huckleberry
Company Name	PRINCETON MINING CORPORATION
Operator Name	Huckleberry Mines Ltd.
City	86 km Southwest of Houston, Omineca Division
Province	British Columbia
Region	Pacific and Yukon
Latitude/Longitude	53 41 N / 127 10 W
Sector	Base metals
Product	Copper-Molybdenum-Gold-Silver
Regulatory Status	Regulations
Effluent Discharge Point	SC-04
Comments	

Parameters	Limits	January	February	March	April	May	June	July	August	Sep.	Oct.	Nov.	Dec.
Flow (m^3/month)	-	85839	77532	85839	247140	648691	217170	123287	155651	150630	299460	103260	85839
TSM (mg/L)	25	3.000	6.000	1.000	2.000	6.000	1.000	1.000	3.000	4.000	7.000	5.000	5.000
As (mg/L)	0.5	0.001	0.000	0.000	0.001	0.001	0.001	0.000	0.000	0.001	0.001	0.001	0.001
Cu (mg/L)	0.3	0.001	0.009	0.005	0.009	0.030	0.004	0.002	0.007	0.008	0.014	0.008	0.006
Ni (mg/L)	0.5	-	-	-	-	-	-	-	-	-	-	-	-
Pb (mg/L)	0.2	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.010	0.010	0.001	0.010
Zn (mg/L)	0.5	0.001	0.006	0.005	0.006	0.005	0.008	0.005	0.005	0.005	0.007	0.008	0.005
Ra-226 (pCi/L)	10	-	-	-	-	-	-	-	-	-	-	-	-
pH	>6.0	6.4	6.6	6.4	7.3	7.6	7.6	7.8	7.9	7.7	7.8	7.8	7.8

Metal Mining Liquid Effluent Regulations (MMLER) & Guidelines (MMLEG)

Monthly Average Effluent Quality Data

Mine/Mill Name	Huckleberry
Company Name	PRINCETON MINING CORPORATION
Operator Name	Huckleberry Mines Ltd.
City	86 km Southwest of Houston, Omineca Division
Province	British Columbia
Region	Pacific and Yukon
Latitude/Longitude	53 41 N / 127 10 W
Sector	Base metals
Product	Copper-Molybdenum-Gold-Silver
Regulatory Status	Regulations
Effluent Discharge Point	SC-04 Seep
Comments	Discharged from February to July

Parameters	Limits	January	February	March	April	May	June	July	August	Sep.	Oct.	Nov.	Dec.
Flow (m^3/month)	-	-	-	-	-	-	-	-	-	-	-	-	-
TSM (mg/L)	25	-	3.000	4.000	1.000	1.000	4.000	1.000	-	-	-	-	-
As (mg/L)	0.5	-	0.000	0.000	0.000	0.000	0.000	0.000	-	-	-	-	-
Cu (mg/L)	0.3	-	0.003	0.004	0.005	0.005	0.003	0.004	-	-	-	-	-
Ni (mg/L)	0.5	-	0.001	0.001	0.001	0.001	0.001	0.001	-	-	-	-	-
Pb (mg/L)	0.2	-	0.001	0.001	0.001	0.001	0.001	0.001	-	-	-	-	-
Zn (mg/L)	0.5	-	0.007	0.006	0.006	0.005	0.005	0.005	-	-	-	-	-
Ra-226 (pCi/L)	10	-	-	-	-	-	-	-	-	-	-	-	-
pH	>6.0	-	7.0	6.2	7.3	7.3	7.6	7.6	-	-	-	-	-

Metal Mining Liquid Effluent Regulations (MMLER) & Guidelines (MMLEG)

Monthly Average Effluent Quality Data

Mine/Mill Name	Huckleberry
Company Name	PRINCETON MINING CORPORATION
Operator Name	Huckleberry Mines Ltd.
City	86 km Southwest of Houston, Omineca Division
Province	British Columbia
Region	Pacific and Yukon
Latitude/Longitude	53 41 N / 127 10 W
Sector	Base metals
Product	Copper-Molybdenum-Gold-Silver
Regulatory Status	Regulations
Effluent Discharge Point	East Zone
Comments	No data for As, Cu, Ni, Pb, Zn

Parameters	Limits	January	February	March	April	May	June	July	August	Sep.	Oct.	Nov.	Dec.
Flow (m^3/month)	-	-	-	-	-	-	-	-	-	-	-	-	-
TSM (mg/L)	25	4.000	1.000	1.000	8.000	2.000	4.000	3.000	**93.000**	2.000	3.000	1.000	5.000
As (mg/L)	0.5	-	-	-	-	-	-	-	-	-	-	-	-
Cu (mg/L)	0.3	-	-	-	-	-	-	-	-	-	-	-	-
Ni (mg/L)	0.5	-	-	-	-	-	-	-	-	-	-	-	-
Pb (mg/L)	0.2	-	-	-	-	-	-	-	-	-	-	-	-
Zn (mg/L)	0.5	-	-	-	-	-	-	-	-	-	-	-	-
Ra-226 (pCi/L)	10	-	-	-	-	-	-	-	-	-	-	-	-
pH	>6.0	6.6	6.6	6.6	7.2	7.2	7.2	7.4	7.3	7.4	7.4	7.3	7.3

Boxed data indicates that a monthly effluent quality standard (MEQS) was exceeded for that month.

Metal Mining Liquid Effluent Regulations (MMLER) & Guidelines (MMLEG)

Monthly Average Effluent Quality Data

Mine/Mill Name	Iron Ore Company of Canada
Company Name	IRON ORE COMPANY OF CANADA
Operator Name	Iron Ore Company of Canada
City	Labrador City
Province	Newfoundland
Region	Atlantic
Latitude/Longitude	53 04 N / 66 57 W
Sector	Iron
Product	Iron
Regulatory Status	Guidelines
Effluent Discharge Point	
Comments	Data not available

Parameters	Limits	January	February	March	April	May	June	July	August	Sep.	Oct.	Nov.	Dec.
Flow (m^3/month)	-	-	-	-	-	-	-	-	-	-	-	-	-
TSM (mg/L)	25	-	-	-	-	-	-	-	-	-	-	-	-
As (mg/L)	0.5	-	-	-	-	-	-	-	-	-	-	-	-
Cu (mg/L)	0.3	-	-	-	-	-	-	-	-	-	-	-	-
Ni (mg/L)	0.5	-	-	-	-	-	-	-	-	-	-	-	-
Pb (mg/L)	0.2	-	-	-	-	-	-	-	-	-	-	-	-
Zn (mg/L)	0.5	-	-	-	-	-	-	-	-	-	-	-	-
Ra-226 (pCi/L)	10	-	-	-	-	-	-	-	-	-	-	-	-
pH	>6.0	-	-	-	-	-	-	-	-	-	-	-	-

Metal Mining Liquid Effluent Regulations (MMLER) & Guidelines (MMLEG)

Monthly Average Effluent Quality Data

Mine/Mill Name	Joe Mann
Company Name	CAMPBELL RESOURCES INC.
Operator Name	Meston Resources Inc.
City	Chibougamau
Province	Quebec
Region	Quebec
Latitude/Longitude	49 29 N / 74 26 W
Sector	Precious metals
Product	Gold-Copper
Regulatory Status	Regulations
Effluent Discharge Point	Final Effluent
Comments	

Parameters		Limits	January	February	March	April	May	June	July	August	Sep.	Oct.	Nov.	Dec.
Flow	(m^3/d)	-	4320	0	0	0	6912	7152	6624	6365	6156	5933	5664	5040
TSM	(mg/L)	25	5.000	-	-	-	5.000	5.000	5.000	5.300	5.000	5.200	5.000	5.000
As	(mg/L)	0.5	-	-	-	-	-	-	-	-	-	-	-	-
Cu	(mg/L)	0.3	0.080	-	-	-	0.020	0.020	0.030	0.040	0.030	0.030	0.020	0.020
Ni	(mg/L)	0.5	-	-	-	-	-	-	-	-	-	-	-	-
Pb	(mg/L)	0.2	0.040	-	-	-	0.040	0.050	0.050	0.040	0.070	0.070	0.070	0.070
Zn	(mg/L)	0.5	-	-	-	-	-	-	-	-	-	-	-	-
Ra-226	(pCi/L)	10	-	-	-	-	-	-	-	-	-	-	-	-
pH		>6.0	6.7	-	-	-	7.7	7.7	7.7	7.8	7.8	8.0	7.7	7.8

Metal Mining Liquid Effluent Regulations (MMLER) & Guidelines (MMLEG)

Monthly Average Effluent Quality Data

Mine/Mill Name	Joubi
Company Name	WESTERN QUEBEC MINES INC.
Operator Name	Western Quebec Mines Inc.
City	Val d'Or
Province	Quebec
Region	Quebec
Latitude/Longitude	48 05 N / 77 52 W
Sector	Precious metals
Product	Gold
Regulatory Status	Regulations
Effluent Discharge Point	Mine Water
Comments	

Parameters		Limits	January	February	March	April	May	June	July	August	Sep.	Oct.	Nov.	Dec.
Flow	(m^3/d)	-	605	605	410	412	320	500	472	371	469	338	475	518
TSM	(mg/L)	25	3.000	4.000	3.000	5.000	3.000	3.000	4.000	4.000	2.000	2.000	3.000	3.000
As	(mg/L)	0.5	0.010	-	-	-	-	-	0.010	-	-	-	-	-
Cu	(mg/L)	0.3	0.010	-	-	-	-	-	0.010	-	-	-	-	-
Ni	(mg/L)	0.5	0.010	-	-	-	-	-	0.010	-	-	-	-	-
Pb	(mg/L)	0.2	0.020	-	-	-	-	-	0.020	-	-	-	-	-
Zn	(mg/L)	0.5	0.010	0.001	0.001	0.001	0.001	0.001	0.020	0.001	0.001	0.001	0.001	0.001
Ra-226	(pCi/L)	10	-	-	-	-	-	-	-	-	-	-	-	-
pH		>6.0	9.4	7.6	7.6	7.7	7.9	7.8	7.6	7.7	7.8	7.9	7.8	7.8

Metal Mining Liquid Effluent Regulations (MMLER) & Guidelines (MMLEG)

Monthly Average Effluent Quality Data

Mine/Mill Name	Katinniq
Company Name	SOCIETE MINIERE RAGLAN DU QUEBEC
Operator Name	Société Minière Raglan du Québec
City	65 km South of Northern tip of Ungava Peninsula
Province	Quebec
Region	Quebec
Latitude/Longitude	61 39 N / 73 41 W
Sector	Base metals
Product	Nickel-Copper-Cobalt
Regulatory Status	Regulations
Effluent Discharge Point	DIR-UT
Comments	

Parameters		Limits	January	February	March	April	May	June	July	August	Sep.	Oct.	Nov.	Dec.
Flow	(m^3/d)	-	173	0	0	1294	2122	2023	3890	2154	2408	3412	1174	2021
TSM	(mg/L)	25	5.400	-	-	4.000	8.100	10.200	9.000	12.800	18.500	12.600	9.300	8.700
As	(mg/L)	0.5	0.010	-	-	0.001	0.002	0.002	0.002	0.012	0.010	0.010	0.001	0.010
Cu	(mg/L)	0.3	0.010	-	-	0.020	0.010	0.020	0.010	0.020	0.030	0.050	0.020	0.030
Ni	(mg/L)	0.5	0.160	-	-	0.050	0.211	0.322	0.200	0.210	0.210	0.180	0.140	0.170
Pb	(mg/L)	0.2	0.020	-	-	0.010	0.003	0.003	0.005	0.003	0.001	0.001	0.003	0.001
Zn	(mg/L)	0.5	0.030	-	-	0.040	0.010	0.020	0.015	0.020	0.015	0.020	0.010	0.025
Ra-226	(pCi/L)	10	-	-	-	-	-	-	-	-	-	-	-	-
pH		>6.0	7.5	-	-	9.0	8.9	8.7	8.3	8.3	9.0	9.2	8.9	8.9

Metal Mining Liquid Effluent Regulations (MMLER) & Guidelines (MMLEG)

Monthly Average Effluent Quality Data

Mine/Mill Name	Katinniq
Company Name	SOCIETE MINIERE RAGLAN DU QUEBEC
Operator Name	Société Minière Raglan du Québec
City	65 km South of Northern tip of Ungava Peninsula
Province	Quebec
Region	Quebec
Latitude/Longitude	61 39 N / 73 41 W
Sector	Base metals
Product	Nickel-Copper-Cobalt
Regulatory Status	Regulations
Effluent Discharge Point	DIR-HS
Comments	Discharged in October Only

Parameters		Limits	January	February	March	April	May	June	July	August	Sep.	Oct.	Nov.	Dec.
Flow	(m^3/d)	-	0	0	0	0	0	0	0	0	0	3935	0	0
TSM	(mg/L)	25	-	-	-	-	-	-	-	-	-	0.500	-	-
As	(mg/L)	0.5	-	-	-	-	-	-	-	-	-	0.001	-	-
Cu	(mg/L)	0.3	-	-	-	-	-	-	-	-	-	0.010	-	-
Ni	(mg/L)	0.5	-	-	-	-	-	-	-	-	-	0.473	-	-
Pb	(mg/L)	0.2	-	-	-	-	-	-	-	-	-	0.001	-	-
Zn	(mg/L)	0.5	-	-	-	-	-	-	-	-	-	0.013	-	-
Ra-226	(pCi/L)	10	-	-	-	-	-	-	-	-	-	-	-	-
pH		>6.0	-	-	-	-	-	-	-	-	-	8.0	-	-

Metal Mining Liquid Effluent Regulations (MMLER) & Guidelines (MMLEG)

Monthly Average Effluent Quality Data

Mine/Mill Name	Key Lake
Company Name	CAMECO CORPORATION
Operator Name	Cameco Corporation
City	Saskatoon
Province	Saskatchewan
Region	Prairie and Northern
Latitude/Longitude	57 11 N / 105 34 W
Sector	Uranium
Product	Uranium
Regulatory Status	Regulations
Effluent Discharge Point	Treated Mill Effluent
Comments	

Parameters	Limits	January	February	March	April	May	June	July	August	Sep.	Oct.	Nov.	Dec.
Flow (m^3/month)	-	170000	185000	291000	309000	305000	128000	258000	219000	232000	310000	220000	205000
TSM (mg/L)	25	3.600	1.600	0.900	0.900	1.300	1.300	3.000	1.300	1.300	1.100	0.900	1.300
As (mg/L)	0.5	0.120	0.120	0.150	0.110	0.060	0.050	0.040	0.040	0.030	0.050	0.060	0.050
Cu (mg/L)	0.3	0.005	0.005	0.005	0.005	0.005	0.005	0.012	0.005	0.005	0.005	0.007	0.005
Ni (mg/L)	0.5	0.045	0.060	0.100	0.110	0.090	0.060	0.050	0.040	0.040	0.080	0.060	0.070
Pb (mg/L)	0.2	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.030	0.010	0.010
Zn (mg/L)	0.5	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.009	0.005	0.005	0.011	0.005
Ra-226 (pCi/L)	10	5.400	2.700	1.080	0.540	2.160	2.430	4.320	4.320	2.700	2.430	1.620	1.620
pH	>6.0	16.5	6.4	6.3	6.3	6.3	6.4	6.4	6.4	6.4	6.3	6.3	6.3

Metal Mining Liquid Effluent Regulations (MMLER) & Guidelines (MMLEG)

Monthly Average Effluent Quality Data

Mine/Mill Name	Keystone
Company Name	BLACK HAWK MINING INC.
Operator Name	Black Hawk Mining Inc.
City	Near Lynn Lake
Province	Manitoba
Region	Prairie and Northern
Latitude/Longitude	56 55 N / 100 27 W
Sector	Precious metals
Product	Gold
Regulatory Status	Regulations
Effluent Discharge Point	Sediment. #1
Comments	

Parameters	Limits	January	February	March	April	May	June	July	August	Sep.	Oct.	Nov.	Dec.
Flow (m^3/month)	-	147176	132459	132459	171706	137365	137365	171706	137365	132459	181518	137365	107930
TSM (mg/L)	25	1.750	1.500	2.500	3.600	3.000	3.500	2.400	3.750	2.250	3.800	9.250	1.000
As (mg/L)	0.5	0.002	0.002	0.002	0.002	0.003	0.002	0.002	0.003	0.004	0.002	0.003	0.002
Cu (mg/L)	0.3	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.004	0.001	0.001
Ni (mg/L)	0.5	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Pb (mg/L)	0.2	0.001	0.001	0.001	0.001	0.001	0.001	0.002	0.002	0.001	0.002	0.001	0.001
Zn (mg/L)	0.5	0.005	0.005	0.011	0.005	0.005	0.005	0.005	0.005	0.005	0.012	0.005	0.005
Ra-226 (pCi/L)	10	-	-	-	-	-	-	-	-	-	-	-	-
pH	>6.0	7.3	7.3	7.0	6.4	6.2	6.1	7.7	8.0	7.9	7.9	8.0	8.0

Metal Mining Liquid Effluent Regulations (MMLER) & Guidelines (MMLEG)

Monthly Average Effluent Quality Data

Mine/Mill Name	Keystone
Company Name	BLACK HAWK MINING INC.
Operator Name	Black Hawk Mining Inc.
City	Near Lynn Lake
Province	Manitoba
Region	Prairie and Northern
Latitude/Longitude	56 55 N / 100 27 W
Sector	Precious metals
Product	Gold
Regulatory Status	Regulations
Effluent Discharge Point	Sediment. #2
Comments	Discharged only in September and October

Parameters	Limits	January	February	March	April	May	June	July	August	Sep.	Oct.	Nov.	Dec.
Flow (m^3/month)	-	-	-	-	-	-	-	-	-	-	-	-	-
TSM (mg/L)	25	-	-	-	-	-	-	-	-	1.000	1.000	-	-
As (mg/L)	0.5	-	-	-	-	-	-	-	-	0.001	0.001	-	-
Cu (mg/L)	0.3	-	-	-	-	-	-	-	-	0.001	0.001	-	-
Ni (mg/L)	0.5	-	-	-	-	-	-	-	-	0.001	0.001	-	-
Pb (mg/L)	0.2	-	-	-	-	-	-	-	-	0.001	0.002	-	-
Zn (mg/L)	0.5	-	-	-	-	-	-	-	-	0.005	0.005	-	-
Ra-226 (pCi/L)	10	-	-	-	-	-	-	-	-	-	-	-	-
pH	>6.0	-	-	-	-	-	-	-	-	8.3	7.4	-	-

Metal Mining Liquid Effluent Regulations (MMLER) & Guidelines (MMLEG)

Monthly Average Effluent Quality Data

Mine/Mill Name	Kidd Creek
Company Name	FALCONBRIDGE LTD.
Operator Name	Falconbridge Ltd.
City	Timmins
Province	Ontario
Region	Ontario
Latitude/Longitude	48 41 N / 81 22 W
Sector	Base metals
Product	Zinc-Copper-Silver-Lead-Cadmium
Regulatory Status	Guidelines
Effluent Discharge Point	Tailings Pond Effluent
Comments	

Parameters		Limits	January	February	March	April	May	June	July	August	Sep.	Oct.	Nov.	Dec.
Flow	(m^3/d)	-	6987	5157	13740	58730	9854	23320	13500	8277	10080	23380	20330	26110
TSM	(mg/L)	25	0.270	0.080	8.200	1.400	0.910	0.880	0.500	0.290	1.200	1.200	0.580	0.360
As	(mg/L)	0.5	0.001	0.001	0.001	-	0.002	0.001	0.003	0.001	-	0.001	0.002	0.001
Cu	(mg/L)	0.3	0.035	0.032	0.042	0.051	0.037	0.027	0.046	0.017	0.014	0.031	0.047	0.061
Ni	(mg/L)	0.5	0.005	0.001	0.005	-	0.001	0.002	0.004	0.006	0.002	0.002	0.005	0.002
Pb	(mg/L)	0.2	0.000	-	-	-	0.001	-	0.001	0.000	-	0.000	0.001	0.001
Zn	(mg/L)	0.5	0.260	0.410	0.490	**0.545**	0.070	0.220	0.310	0.090	0.060	0.330	0.310	**0.837**
Ra-226	(pCi/L)	10	-	-	-	-	-	-	-	-	-	-	-	-
pH		>6.0	7.3	7.2	7.5	7.5	7.2	7.6	7.8	8.1	8.2	7.5	7.2	7.6

Boxed data indicates that a monthly effluent quality standard (MEQS) was exceeded for that month.

Metal Mining Liquid Effluent Regulations (MMLER) & Guidelines (MMLEG)

Monthly Average Effluent Quality Data

Mine/Mill Name	Lac Matagami
Company Name	NORANDA MINING AND EXPLORATION INC.
Operator Name	Noranda Mining and Exploration Inc.
City	Matagami
Province	Quebec
Region	Quebec
Latitude/Longitude	49 43 N / 77 43 W
Sector	Base metals
Product	Zinc-Copper
Regulatory Status	Guidelines
Effluent Discharge Point	Final Effluent
Comments	

Parameters		Limits	January	February	March	April	May	June	July	August	Sep.	Oct.	Nov.	Dec.
Flow	(m^3/d)	-	6300	7056	25978	31896	16896	11640	8534	11033	25549	18904	26831	19362
TSM	(mg/L)	25	2.000	2.000	1.400	8.000	2.000	3.000	2.000	2.000	1.000	4.000	4.000	2.400
As	(mg/L)	0.5	0.050	-	-	-	-	-	-	-	-	-	-	-
Cu	(mg/L)	0.3	0.010	0.010	0.019	0.020	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
Ni	(mg/L)	0.5	0.020	0.020	0.020	0.010	0.010	0.020	0.020	0.020	0.020	0.020	0.020	0.020
Pb	(mg/L)	0.2	0.070	0.060	0.050	0.010	0.030	0.030	0.040	0.030	0.050	0.040	0.010	0.030
Zn	(mg/L)	0.5	0.040	0.030	0.020	0.240	0.020	0.020	0.030	0.020	0.100	0.110	0.050	0.040
Ra-226	(pCi/L)	10	-	-	-	-	-	-	-	-	-	-	-	-
pH		>6.0	8.9	8.9	9.0	8.6	9.3	8.8	8.4	8.4	7.7	8.6	8.6	8.5

Metal Mining Liquid Effluent Regulations (MMLER) & Guidelines (MMLEG)

Monthly Average Effluent Quality Data

Mine/Mill Name	Lac Tio
Company Name	QIT-FER ET TITANE INC.
Operator Name	QIT-Fer et Titane Inc.
City	Havre St-Pierre
Province	Quebec
Region	Quebec
Latitude/Longitude	50 33 N / 63 25 W
Sector	Iron
Product	Iron-Titanium
Regulatory Status	Guidelines
Effluent Discharge Point	Mine Water
Comments	No data for January and April. No flow rates provided

Parameters		Limits	January	February	March	April	May	June	July	August	Sep.	Oct.	Nov.	Dec.
Flow	(m^3/d)	-	-	-	-	-	-	-	-	-	-	-	-	-
TSM	(mg/L)	25	-	2.200	1.600	-	0.700	2.700	0.400	-	-	**437.000**	10.600	-
As	(mg/L)	0.5	-	0.001	0.001	-	0.001	0.001	0.001	0.001	0.002	0.001	0.005	0.001
Cu	(mg/L)	0.3	-	0.010	0.010	-	0.010	0.010	0.010	0.030	0.020	0.010	0.180	0.010
Ni	(mg/L)	0.5	-	0.210	0.320	-	0.150	0.150	0.260	0.230	0.290	0.040	0.220	0.010
Pb	(mg/L)	0.2	-	0.001	0.001	-	0.004	0.005	0.004	0.100	0.006	0.002	0.010	0.100
Zn	(mg/L)	0.5	-	0.010	0.010	-	0.025	0.020	0.010	0.020	0.020	0.020	0.020	0.010
Ra-226	(pCi/L)	10	-	-	-	-	-	-	-	-	-	-	-	-
pH		>6.0	-	7.6	7.3	-	7.6	7.6	7.5	-	-	6.0	7.6	-

Boxed data indicates that a monthly effluent quality standard (MEQS) was exceeded for that month.

Metal Mining Liquid Effluent Regulations (MMLER) & Guidelines (MMLEG)

Monthly Average Effluent Quality Data

Mine/Mill Name	Les Mines Selbaie
Company Name	GENCOR LTD.
Operator Name	Billiton Metals Canada Inc.
City	180 km North of Rouyn-Noranda
Province	Quebec
Region	Quebec
Latitude/Longitude	49 41 N / 78 57 W
Sector	Base metals
Product	Copper-Zinc-Gold-Silver
Regulatory Status	Regulations
Effluent Discharge Point	Polishing Pond Discharge
Comments	

Parameters		Limits	January	February	March	April	May	June	July	August	Sep.	Oct.	Nov.	Dec.
Flow	(m^3/d)	-	18000	13579	14112	14314	21456	23616	21600	15696	13968	19728	13723	21312
TSM	(mg/L)	25	1.000	3.000	2.000	7.000	3.000	2.000	1.000	1.000	3.000	1.000	3.000	2.000
As	(mg/L)	0.5	-	0.050	-	-	-	-	-	-	0.050	-	-	0.050
Cu	(mg/L)	0.3	0.050	0.030	0.050	0.020	0.030	0.040	0.040	0.040	0.040	0.040	0.030	0.030
Ni	(mg/L)	0.5	-	0.050	-	-	-	-	-	-	0.050	-	-	0.050
Pb	(mg/L)	0.2	-	0.001	-	-	-	-	-	-	0.050	-	-	0.050
Zn	(mg/L)	0.5	0.300	0.250	0.190	**2.480**	0.230	0.150	0.190	0.240	0.130	0.160	0.140	0.240
Ra-226	(pCi/L)	10	-	-	-	-	-	-	-	-	-	-	-	-
pH		>6.0	9.4	9.4	9.3	9.4	8.8	9.0	9.2	9.0	9.3	9.5	9.5	9.4

Boxed data indicates that a monthly effluent quality standard (MEQS) was exceeded for that month.

Metal Mining Liquid Effluent Regulations (MMLER) & Guidelines (MMLEG)

Monthly Average Effluent Quality Data

Mine/Mill Name	Lockerby
Company Name	FALCONBRIDGE LTD.
Operator Name	Falconbridge Ltd.
City	Whitefish
Province	Ontario
Region	Ontario
Latitude/Longitude	46 26 N / 81 19 W
Sector	Base metals
Product	Copper-Nickel-Cobalt
Regulatory Status	Guidelines
Effluent Discharge Point	Lockerby
Comments	

Parameters		Limits	January	February	March	April	May	June	July	August	Sep.	Oct.	Nov.	Dec.
Flow	(m^3/d)	-	2050	1824	1996	3792	2091	2350	2813	2484	1354	1548	1663	1609
TSM	(mg/L)	25	1.250	1.550	1.310	2.490	4.300	2.030	1.500	0.960	0.690	1.450	1.250	0.740
As	(mg/L)	0.5	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Cu	(mg/L)	0.3	0.020	0.020	0.060	0.020	0.010	0.020	0.010	0.010	0.010	0.010	0.020	0.020
Ni	(mg/L)	0.5	0.220	0.180	0.140	0.460	0.180	0.200	0.110	0.090	0.250	0.170	0.230	0.538
Pb	(mg/L)	0.2	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.040	0.001
Zn	(mg/L)	0.5	0.030	0.040	0.040	0.030	0.019	0.001	0.002	0.002	0.002	0.002	0.004	0.007
Ra-226	(pCi/L)	10	-	-	-	-	-	-	-	-	-	-	-	-
pH		>6.0	7.2	7.5	7.0	8.1	7.2	7.1	7.1	7.0	8.0	7.0	7.3	7.4

Boxed data indicates that a monthly effluent quality standard (MEQS) was exceeded for that month.

Metal Mining Liquid Effluent Regulations (MMLER) & Guidelines (MMLEG)

Monthly Average Effluent Quality Data

Mine/Mill Name	Louvicourt
Company Name	NOVICOURT INC.
Operator Name	Aur Resources Inc.
City	Val d'Or
Province	Quebec
Region	Quebec
Latitude/Longitude	48 06 N / 77 30 W
Sector	Base metals
Product	Copper-Zinc-Silver-Gold
Regulatory Status	Regulations
Effluent Discharge Point	Polishing Pond Discharge
Comments	

Parameters		Limits	January	February	March	April	May	June	July	August	Sep.	Oct.	Nov.	Dec.
Flow	(m^3/d)	-	0	0	0	0	16157	9835	17179	11520	15094	11459	14940	25560
TSM	(mg/L)	25	-	-	-	-	6.100	18.400	11.200	6.900	7.800	4.900	3.000	3.200
As	(mg/L)	0.5	-	-	-	-	0.010	-	-	-	0.010	-	-	-
Cu	(mg/L)	0.3	-	-	-	-	0.030	-	-	-	0.050	-	-	-
Ni	(mg/L)	0.5	-	-	-	-	0.040	-	-	-	0.080	-	-	-
Pb	(mg/L)	0.2	-	-	-	-	0.020	-	-	-	0.010	-	-	-
Zn	(mg/L)	0.5	-	-	-	-	0.030	-	-	-	0.020	-	-	-
Ra-226	(pCi/L)	10	-	-	-	-	-	-	-	-	-	-	-	-
pH		>6.0	-	-	-	-	7.6	6.8	7.9	7.7	7.5	7.3	7.1	7.3

Metal Mining Liquid Effluent Regulations (MMLER) & Guidelines (MMLEG)

Monthly Average Effluent Quality Data

Mine/Mill Name	Mount-Wright
Company Name	QUEBEC CARTIER MINING COMPANY
Operator Name	Québec Cartier Mining Company
City	Fermont
Province	Quebec
Region	Quebec
Latitude/Longitude	52 46 N / 67 20 W
Sector	Iron
Product	Iron
Regulatory Status	Guidelines
Effluent Discharge Point	Mine Water, Lake Hesse South, HS-1
Comments	As, Cu, Pb, Ni and Zn given for June only

Parameters		Limits	January	February	March	April	May	June	July	August	Sep.	Oct.	Nov.	Dec.
Flow	(m^3/d)	-	24000	24000	24000	105600	420960	263400	223680	134400	360600	437592	33600	24000
TSM	(mg/L)	25	0.500	0.200	0.100	2.400	5.800	3.900	3.800	2.700	7.700	5.100	0.900	1.800
As	(mg/L)	0.5	-	-	-	-	-	0.002	-	-	-	-	-	-
Cu	(mg/L)	0.3	-	-	-	-	-	0.010	-	-	-	-	-	-
Ni	(mg/L)	0.5	-	-	-	-	-	0.007	-	-	-	-	-	-
Pb	(mg/L)	0.2	-	-	-	-	-	0.020	-	-	-	-	-	-
Zn	(mg/L)	0.5	-	-	-	-	-	0.050	-	-	-	-	-	-
Ra-226	(pCi/L)	10	-	-	-	-	-	-	-	-	-	-	-	-
pH		>6.0	6.6	6.9	7.0	7.0	6.9	7.3	7.2	7.6	7.1	6.9	6.7	7.6

Metal Mining Liquid Effluent Regulations (MMLER) & Guidelines (MMLEG)

Monthly Average Effluent Quality Data

Mine/Mill Name	Mount-Wright
Company Name	QUEBEC CARTIER MINING COMPANY
Operator Name	Québec Cartier Mining Company
City	Fermont
Province	Quebec
Region	Quebec
Latitude/Longitude	52 46 N / 67 20 W
Sector	Iron
Product	Iron
Regulatory Status	Guidelines
Effluent Discharge Point	Mine Water, Mount Survie South, MS-2
Comments	No discharge in January, February, March, April and December (frozen). - As, Cu, Pb, Ni, Zn given for June only

Parameters		Limits	January	February	March	April	May	June	July	August	Sep.	Oct.	Nov.	Dec.
Flow	(m^3/d)	-	-	-	-	-	-	768	1382	1255	1824	1817	-	-
TSM	(mg/L)	25	-	-	-	-	**80.000**	2.800	4.500	14.100	3.600	5.800	-	-
As	(mg/L)	0.5	-	-	-	-	-	0.001	-	-	-	-	-	-
Cu	(mg/L)	0.3	-	-	-	-	-	0.010	-	-	-	-	-	-
Ni	(mg/L)	0.5	-	-	-	-	-	0.013	-	-	-	-	-	-
Pb	(mg/L)	0.2	-	-	-	-	-	0.020	-	-	-	-	-	-
Zn	(mg/L)	0.5	-	-	-	-	-	0.050	-	-	-	-	-	-
Ra-226	(pCi/L)	10	-	-	-	-	-	-	-	-	-	-	-	-
pH		>6.0	-	-	-	-	7.2	7.2	7.0	7.5	7.2	6.8	-	-

Boxed data indicates that a monthly effluent quality standard (MEQS) was exceeded for that month.

Metal Mining Liquid Effluent Regulations (MMLER) & Guidelines (MMLEG)

Monthly Average Effluent Quality Data

Mine/Mill Name	Mount-Wright
Company Name	QUEBEC CARTIER MINING COMPANY
Operator Name	Québec Cartier Mining Company
City	Fermont
Province	Quebec
Region	Quebec
Latitude/Longitude	52 46 N / 67 20 W
Sector	Iron
Product	Iron
Regulatory Status	Guidelines
Effluent Discharge Point	Mine Water, Mount-Wright West, LW-1
Comments	No discharge from January to April and from November to December (frozen)

Parameters		Limits	January	February	March	April	May	June	July	August	Sep.	Oct.	Nov.	Dec.
Flow	(m^3/d)	-	-	-	-	-	-	-	-	-	-	-	-	-
TSM	(mg/L)	25	-	-	-	-	11.000	5.000	5.000	5.000	5.000	5.000	-	-
As	(mg/L)	0.5	-	-	-	-	-	0.002	-	-	-	-	-	-
Cu	(mg/L)	0.3	-	-	-	-	-	0.002	-	-	-	-	-	-
Ni	(mg/L)	0.5	-	-	-	-	-	0.008	-	-	-	-	-	-
Pb	(mg/L)	0.2	-	-	-	-	-	0.002	-	-	-	-	-	-
Zn	(mg/L)	0.5	-	-	-	-	-	0.002	-	-	-	-	-	-
Ra-226	(pCi/L)	10	-	-	-	-	-	-	-	-	-	-	-	-
pH		>6.0	-	-	-	-	6.6	8.5	7.0	7.3	7.4	7.2	-	-

Metal Mining Liquid Effluent Regulations (MMLER) & Guidelines (MMLEG)

Monthly Average Effluent Quality Data

Mine/Mill Name	Mouska
Company Name	CAMBIOR INC.
Operator Name	Cambior Inc.
City	Destor
Province	Quebec
Region	Quebec
Latitude/Longitude	48 17 N / 78 34 W
Sector	Precious metals
Product	Gold
Regulatory Status	Regulations
Effluent Discharge Point	Mine Water
Comments	

Parameters		Limits	January	February	March	April	May	June	July	August	Sep.	Oct.	Nov.	Dec.
Flow	(m^3/d)	-	2678	2678	2678	2678	2678	2678	2678	2678	2678	2678	2678	2678
TSM	(mg/L)	25	5.000	6.000	5.000	4.000	7.000	10.000	8.000	5.000	8.000	7.000	9.000	9.000
As	(mg/L)	0.5	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Cu	(mg/L)	0.3	0.030	0.030	0.030	0.030	0.020	0.040	0.070	0.020	0.020	0.030	0.030	0.040
Ni	(mg/L)	0.5	-	-	-	-	-	-	-	-	-	-	-	-
Pb	(mg/L)	0.2	-	-	-	-	-	-	-	-	-	-	-	-
Zn	(mg/L)	0.5	-	-	-	-	-	-	-	-	-	-	-	-
Ra-226	(pCi/L)	10	-	-	-	-	-	-	-	-	-	-	-	-
pH		>6.0	7.6	7.6	7.4	7.9	7.7	7.8	7.7	7.7	7.6	7.6	7.0	7.6

Metal Mining Liquid Effluent Regulations (MMLER) & Guidelines (MMLEG)

Monthly Average Effluent Quality Data

Mine/Mill Name	Myra Falls Operations
Company Name	BILIDEN WESTMIN (Canada) LIMITED
Operator Name	Westmin Resources Limited
City	Campbell River
Province	British Columbia
Region	Pacific and Yukon
Latitude/Longitude	49 34 N / 125 35 W
Sector	Base metals
Product	Copper-Zinc-Gold-Silver
Regulatory Status	Regulations
Effluent Discharge Point	Pond
Comments	

Parameters	Limits	January	February	March	April	May	June	July	August	Sep.	Oct.	Nov.	Dec.
Flow (m^3/month)	-	-	-	-	-	-	-	-	-	-	-	-	-
TSM (mg/L)	25	1.000	7.000	6.000	2.000	12.000	22.000	5.000	5.000	1.000	3.000	3.000	14.000
As (mg/L)	0.5	-	-	-	-	-	-	-	-	-	-	-	-
Cu (mg/L)	0.3	0.030	0.002	0.007	0.003	0.010	0.001	0.001	0.001	0.020	0.020	0.012	0.007
Ni (mg/L)	0.5	-	-	-	-	-	-	-	-	-	-	-	-
Pb (mg/L)	0.2	0.001	0.001	0.002	0.001	0.001	0.001	0.002	0.001	0.001	0.001	0.001	0.001
Zn (mg/L)	0.5	0.060	0.076	0.118	0.080	0.014	0.061	0.039	0.040	0.038	0.213	0.117	0.087
Ra-226 (pCi/L)	10	-	-	-	-	-	-	-	-	-	-	-	-
pH	>6.0	10.4	10.1	10.9	10.6	10.8	10.5	10.9	10.2	10.4	10.2	10.9	10.8

Metal Mining Liquid Effluent Regulations (MMLER) & Guidelines (MMLEG)

Monthly Average Effluent Quality Data

Mine/Mill Name	Nanisivik
Company Name	BREAKWATER RESOURCES LTD.
Operator Name	Breakwater Resources Ltd.
City	750 km North of Arctic Circle, Baffin Island
Province	Northwest Territories
Region	Prairie and Northern
Latitude/Longitude	73 03 N / 84 25 W
Sector	Base metals
Product	Zinc-Lead-Silver
Regulatory Status	Guidelines
Effluent Discharge Point	Pond 159 - 4
Comments	Discharged only in June, July and September

Parameters	Limits	January	February	March	April	May	June	July	August	Sep.	Oct.	Nov.	Dec.
Flow (m^3/month)	-	-	-	-	-	-	16748	249641	-	39709	-	-	-
TSM (mg/L)	25	-	-	-	-	-	2.900	13.300	-	22.200	-	-	-
As (mg/L)	0.5	-	-	-	-	-	0.001	0.001	-	0.001	-	-	-
Cu (mg/L)	0.3	-	-	-	-	-	0.001	0.001	-	0.001	-	-	-
Ni (mg/L)	0.5	-	-	-	-	-	0.001	0.001	-	0.001	-	-	-
Pb (mg/L)	0.2	-	-	-	-	-	0.002	0.003	-	0.004	-	-	-
Zn (mg/L)	0.5	-	-	-	-	-	0.099	0.071	-	0.117	-	-	-
Ra-226 (pCi/L)	10	-	-	-	-	-	-	-	-	-	-	-	-
pH	>6.0	-	-	-	-	-	8.0	7.0	-	6.6	-	-	-

Metal Mining Liquid Effluent Regulations (MMLER) & Guidelines (MMLEG)

Monthly Average Effluent Quality Data

Mine/Mill Name	Niobec
Company Name	TECK CORPORATION & CAMBIOR INC.
Operator Name	Teck Corporation
City	St-Honoré
Province	Quebec
Region	Quebec
Latitude/Longitude	48 32 N / 71 09 W
Sector	Base metals
Product	Niobium
Regulatory Status	Regulations
Effluent Discharge Point	Tailings Pond
Comments	

Parameters		Limits	January	February	March	April	May	June	July	August	Sep.	Oct.	Nov.	Dec.
Flow	(m^3/d)	-	-	-	-	-	-	-	-	-	-	-	-	-
TSM	(mg/L)	25	8.000	9.000	10.000	19.000	16.000	10.000	16.000	7.000	7.000	8.000	7.000	8.000
As	(mg/L)	0.5	-	-	-	-	-	-	-	-	-	-	-	-
Cu	(mg/L)	0.3	0.008	0.005	0.031	0.032	0.003	0.050	0.010	0.010	0.010	0.040	0.011	0.020
Ni	(mg/L)	0.5	-	0.020	-	-	-	-	-	-	-	-	-	-
Pb	(mg/L)	0.2	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.070	0.070	0.070
Zn	(mg/L)	0.5	-	0.050	-	-	-	-	-	-	-	-	-	-
Ra-226	(pCi/L)	10	-	-	-	-	-	-	-	-	-	-	-	-
pH		>6.0	7.8	7.2	7.7	7.8	7.9	7.9	7.8	7.8	7.8	7.9	7.9	7.5

Metal Mining Liquid Effluent Regulations (MMLER) & Guidelines (MMLEG)

Monthly Average Effluent Quality Data

Mine/Mill Name	Niobec
Company Name	TECK CORPORATION & CAMBIOR INC.
Operator Name	Teck Corporation
City	St-Honoré
Province	Quebec
Region	Quebec
Latitude/Longitude	48 32 N / 71 09 W
Sector	Base metals
Product	Niobium
Regulatory Status	Regulations
Effluent Discharge Point	Mine Water
Comments	

Parameters		Limits	January	February	March	April	May	June	July	August	Sep.	Oct.	Nov.	Dec.
Flow	(m^3/d)	-	-	-	-	-	-	-	-	-	-	-	-	-
TSM	(mg/L)	25	22.000	14.000	12.000	15.000	13.000	14.000	10.000	12.000	13.000	14.000	**26.000**	19.000
As	(mg/L)	0.5	-	-	-	-	-	-	-	-	-	-	-	-
Cu	(mg/L)	0.3	0.032	0.026	0.008	0.003	0.040	0.010	0.030	0.050	0.020	0.010	0.051	0.040
Ni	(mg/L)	0.5	-	0.020	-	-	-	-	-	-	-	-	-	-
Pb	(mg/L)	0.2	0.040	0.040	0.040	0.040	0.040	0.060	0.040	0.040	0.040	0.070	0.050	0.070
Zn	(mg/L)	0.5	-	0.070	-	-	-	-	-	-	-	-	-	-
Ra-226	(pCi/L)	10	-	-	-	-	-	-	-	-	-	-	-	-
pH		>6.0	7.5	7.4	7.5	7.5	7.6	7.6	7.8	7.7	7.8	7.8	7.9	7.9

Boxed data indicates that a monthly effluent quality standard (MEQS) was exceeded for that month.

Metal Mining Liquid Effluent Regulations (MMLER) & Guidelines (MMLEG)

Monthly Average Effluent Quality Data

Mine/Mill Name	Nolin Creek Treatment Plant
Company Name	INCO LIMITED
Operator Name	INCO Limited
City	Copper Cliff
Province	Ontario
Region	Ontario
Latitude/Longitude	46 30 N / 81 00 W
Sector	Base metals
Product	Nickel-Copper-Cobalt-Platinum
Regulatory Status	Guidelines
Effluent Discharge Point	
Comments	

Parameters		Limits	January	February	March	April	May	June	July	August	Sep.	Oct.	Nov.	Dec.
Flow	(m^3/d)	-	4277	4501	6459	21440	13850	13810	5983	-	22880	9029	19300	9528
TSM	(mg/L)	25	-	-	-	-	-	-	-	-	-	-	-	-
As	(mg/L)	0.5	0.001	0.001	0.001	0.007	0.006	0.007	-	-	-	-	-	-
Cu	(mg/L)	0.3	0.030	0.026	0.041	0.114	0.035	0.091	0.019	-	0.086	0.091	0.055	0.043
Ni	(mg/L)	0.5	0.363	0.320	**0.699**	0.407	0.199	0.427	0.227	0.356	**0.611**	0.178	0.301	0.372
Pb	(mg/L)	0.2	0.015	0.016	0.015	0.015	0.015	0.015	0.035	-	0.015	0.015	0.023	0.022
Zn	(mg/L)	0.5	0.006	0.006	0.006	0.007	0.006	0.009	0.041	-	0.006	0.006	0.008	0.006
Ra-226	(pCi/L)	10	-	-	-	-	-	-	-	-	-	-	-	-
pH		>6.0	-	-	-	-	-	-	-	-	-	-	-	-

Boxed data indicates that a monthly effluent quality standard (MEQS) was exceeded for that month.

Metal Mining Liquid Effluent Regulations (MMLER) & Guidelines (MMLEG)

Monthly Average Effluent Quality Data

Mine/Mill Name	Photo Lake
Company Name	HUDSON BAY MINING AND SMELTING CO., LTD
Operator Name	Hudson Bay Mining and Smelting Co., Ltd
City	Near Snow Lake
Province	Manitoba
Region	Prairie and Northern
Latitude/Longitude	54 52 N / 100 06 W
Sector	Base metals
Product	Copper-Zinc-Gold-Silver
Regulatory Status	Regulations
Effluent Discharge Point	End of pipe Discharge
Comments	

Parameters	Limits	January	February	March	April	May	June	July	August	Sep.	Oct.	Nov.	Dec.
Flow (m^3/month)	-	35850	30100	31350	32250	29350	35550	29400	32900	37700	34300	43100	38000
TSM (mg/L)	25	6.000	4.000	7.800	5.000	9.500	10.800	8.500	7.600	8.500	9.500	7.800	6.750
As (mg/L)	0.5	0.002	0.002	0.002	0.003	0.003	0.002	0.002	0.004	0.002	0.002	0.003	0.002
Cu (mg/L)	0.3	0.040	0.028	0.030	0.013	0.018	0.028	0.015	0.026	0.013	0.010	0.022	0.015
Ni (mg/L)	0.5	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010
Pb (mg/L)	0.2	0.043	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040	0.040
Zn (mg/L)	0.5	0.443	0.260	0.360	0.398	0.340	0.402	0.283	0.236	0.135	0.318	0.114	0.300
Ra-226 (pCi/L)	10	-	-	-	-	-	-	-	-	-	-	-	-
pH	>6.0	7.5	7.6	7.5	7.6	7.8	7.8	7.8	7.8	7.6	7.8	7.8	7.7

Metal Mining Liquid Effluent Regulations (MMLER) & Guidelines (MMLEG)

Monthly Average Effluent Quality Data

Mine/Mill Name	Polaris
Company Name	COMINCO LTD.
Operator Name	Cominco Ltd.
City	Little Cornwallis Island
Province	Northwest Territories
Region	Prairie and Northern
Latitude/Longitude	75 23 N / 96 56 W
Sector	Base metals
Product	Lead-Zinc
Regulatory Status	Regulations
Effluent Discharge Point	Sample Station 262-7
Comments	Discharged only in July and August

Parameters	Limits	January	February	March	April	May	June	July	August	Sep.	Oct.	Nov.	Dec.
Flow (m^3/month)	-	-	-	-	-	-	-	1236190	953040	-	-	-	-
TSM (mg/L)	25	-	-	-	-	-	-	2.400	2.000	-	-	-	-
As (mg/L)	0.5	-	-	-	-	-	-	0.001	0.001	-	-	-	-
Cu (mg/L)	0.3	-	-	-	-	-	-	0.001	0.001	-	-	-	-
Ni (mg/L)	0.5	-	-	-	-	-	-	0.002	0.001	-	-	-	-
Pb (mg/L)	0.2	-	-	-	-	-	-	0.003	0.020	-	-	-	-
Zn (mg/L)	0.5	-	-	-	-	-	-	0.124	0.220	-	-	-	-
Ra-226 (pCi/L)	10	-	-	-	-	-	-	0.001	0.001	-	-	-	-
pH	>6.0	-	-	-	-	-	-	8.0	8.1	-	-	-	-

Metal Mining Liquid Effluent Regulations (MMLER) & Guidelines (MMLEG)

Monthly Average Effluent Quality Data

Mine/Mill Name	Principale
Company Name	CAMPBELL RESOURCES INC.
Operator Name	Meston Resources Inc.
City	Chibougamau
Province	Quebec
Region	Quebec
Latitude/Longitude	49 51 N / 74 19.5 W
Sector	Precious metals
Product	Gold-Copper
Regulatory Status	Guidelines
Effluent Discharge Point	Effluent No. 2
Comments	No discharge for February, March and April - No As, Ni and Zn values for the whole year

Parameters		Limits	January	February	March	April	May	June	July	August	Sep.	Oct.	Nov.	Dec.
Flow	(m^3/d)	-	4320	0	0	0	12240	18240	14400	19080	18360	13248	8640	6480
TSM	(mg/L)	25	5.000	-	-	-	5.000	5.000	5.000	5.000	5.000	5.000	5.000	5.000
As	(mg/L)	0.5	-	-	-	-	-	-	-	-	-	-	-	-
Cu	(mg/L)	0.3	**0.330**	-	-	-	**0.370**	0.210	0.100	0.050	0.120	0.150	0.140	0.150
Ni	(mg/L)	0.5	-	-	-	-	-	-	-	-	-	-	-	-
Pb	(mg/L)	0.2	0.040	-	-	-	0.040	0.050	0.082	0.040	0.050	0.072	0.070	0.070
Zn	(mg/L)	0.5	-	-	-	-	-	-	-	-	-	-	-	-
Ra-226	(pCi/L)	10	-	-	-	-	-	-	-	-	-	-	-	-
pH		>6.0	7.4	-	-	-	7.4	7.5	7.6	7.6	7.8	7.7	7.7	7.8

Boxed data indicates that a monthly effluent quality standard (MEQS) was exceeded for that month.

Metal Mining Liquid Effluent Regulations (MMLER) & Guidelines (MMLEG)

Monthly Average Effluent Quality Data

Mine/Mill Name	Rabbit Lake
Company Name	CAMECO CORPORATION
Operator Name	Cameco Corporation
City	Saskatoon
Province	Saskatchewan
Region	Prairie and Northern
Latitude/Longitude	58 10 N / 103 40 W
Sector	Uranium
Product	Uranium
Regulatory Status	Regulations
Effluent Discharge Point	Treated Mill Effluent, Station 2.3.3
Comments	

Parameters	Limits	January	February	March	April	May	June	July	August	Sep.	Oct.	Nov.	Dec.
Flow (m^3/month)	-	234269	219652	250689	352973	372339	287495	270378	277478	277208	304068	249149	236769
TSM (mg/L)	25	2.200	3.800	4.000	6.000	2.600	3.500	2.500	4.000	3.300	2.200	2.600	1.000
As (mg/L)	0.5	0.059	0.170	0.123	0.125	0.082	0.130	0.097	0.129	0.110	0.144	0.131	0.081
Cu (mg/L)	0.3	0.005	0.020	0.017	0.011	0.003	0.004	0.007	0.008	0.005	0.004	0.006	0.004
Ni (mg/L)	0.5	0.040	0.055	0.058	0.046	0.067	0.054	0.068	0.060	0.081	0.143	0.111	0.055
Pb (mg/L)	0.2	0.002	0.002	0.002	0.002	0.002	0.002	0.005	0.002	0.002	0.002	0.002	0.002
Zn (mg/L)	0.5	0.005	0.005	0.006	0.005	0.005	0.005	0.006	0.005	0.006	0.005	0.005	0.005
Ra-226 (pCi/L)	10	0.220	0.140	0.270	0.270	0.220	0.160	0.140	0.540	0.140	0.270	0.160	0.140
pH	>6.0	7.1	7.1	7.0	7.1	7.0	6.9	6.8	7.2	7.5	7.2	7.4	7.2

Metal Mining Liquid Effluent Regulations (MMLER) & Guidelines (MMLEG)

Monthly Average Effluent Quality Data

Mine/Mill Name	Restigouche
Company Name	CANZINCO LTD
Operator Name	CanZinco Ltd.
City	Bathurst Area
Province	New Brunswick
Region	Atlantic
Latitude/Longitude	47 30 N / 66 34 W
Sector	Base metals
Product	Zinc-Lead-Silver
Regulatory Status	Regulations
Effluent Discharge Point	Mixing Structure Discharged into Charlotte Brook
Comments	Mine was shut down August 2, 1998

Parameters	Limits	January	February	March	April	May	June	July	August	Sep.	Oct.	Nov.	Dec.
Flow (m^3/month)	-	-	-	180000	80000	75000	21000	29000	-	-	-	-	-
TSM (mg/L)	25	2.000	-	2.000	2.000	2.000	2.000	2.000	-	-	-	-	-
As (mg/L)	0.5	0.002	-	0.002	0.002	0.001	0.001	0.001	-	-	-	-	-
Cu (mg/L)	0.3	0.001	-	0.001	0.001	0.001	0.002	0.002	-	-	-	-	-
Ni (mg/L)	0.5	0.001	-	0.001	0.001	0.001	0.001	0.001	-	-	-	-	-
Pb (mg/L)	0.2	0.002	-	0.003	0.003	0.001	0.003	0.001	-	-	-	-	-
Zn (mg/L)	0.5	0.009	-	0.078	0.089	0.086	0.075	0.081	-	-	-	-	-
Ra-226 (pCi/L)	10	-	-	-	-	-	-	-	-	-	-	-	-
pH	>6.0	6.8	-	6.8	6.8	6.8	6.8	6.7	6.6	-	-	-	-

Metal Mining Liquid Effluent Regulations (MMLER) & Guidelines (MMLEG)

Monthly Average Effluent Quality Data

Mine/Mill Name	Ruttan
Company Name	HUDSON BAY MINING AND SMELTING CO., LTD
Operator Name	Hudson Bay Mining and Smelting Co., Ltd
City	20 km East of Leaf Rapids
Province	Manitoba
Region	Prairie and Northern
Latitude/Longitude	56 40 N / 99 38 W
Sector	Base metals
Product	Copper-Zinc
Regulatory Status	Guidelines
Effluent Discharge Point	Brehaut Lake Outfall
Comments	No discharge in January, February, March and April as well as from November 25 to December 31

Parameters	Limits	January	February	March	April	May	June	July	August	Sep.	Oct.	Nov.	Dec.
Flow (m^3/month)	-	-	-	-	-	998784	2663280	1175282	1161533	1202494	800280	505440	-
TSM (mg/L)	25	-	-	-	-	5.250	9.750	7.400	6.000	6.750	7.000	6.000	-
As (mg/L)	0.5	-	-	-	-	0.002	0.001	0.001	0.003	0.001	0.002	0.002	-
Cu (mg/L)	0.3	-	-	-	-	0.015	0.013	0.010	0.010	0.010	0.010	0.020	-
Ni (mg/L)	0.5	-	-	-	-	0.010	0.010	0.012	0.013	0.010	0.013	0.010	-
Pb (mg/L)	0.2	-	-	-	-	0.040	0.040	0.040	0.040	0.040	0.040	0.040	-
Zn (mg/L)	0.5	-	-	-	-	0.475	0.280	0.120	0.097	0.048	0.158	0.273	-
Ra-226 (pCi/L)	10	-	-	-	-	-	-	-	-	-	-	-	-
pH	>6.0	-	-	-	-	7.3	7.4	7.7	8.0	7.3	7.4	7.1	-

Metal Mining Liquid Effluent Regulations (MMLER) & Guidelines (MMLEG)

Monthly Average Effluent Quality Data

Mine/Mill Name	Sigma #2
Company Name	McWATTERS MINING INC.
Operator Name	McWatters Mining Inc.
City	Val d'Or
Province	Quebec
Region	Quebec
Latitude/Longitude	48 06 N / 77 45 W
Sector	Precious metals
Product	Gold
Regulatory Status	Regulations
Effluent Discharge Point	Mine Water
Comments	

Parameters	Limits	January	February	March	April	May	June	July	August	Sep.	Oct.	Nov.	Dec.
Flow (m^3/d)	-	98	235	384	999	562	406	496	59	253	579	12	0
TSM (mg/L)	25	0.800	1.100	0.500	3.100	0.350	3.250	9.700	9.300	5.200	23.400	21.300	-
As (mg/L)	0.5	0.010	0.010	0.020	0.030	0.010	0.020	0.020	0.050	0.010	0.010	0.010	-
Cu (mg/L)	0.3	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	-
Ni (mg/L)	0.5	0.040	0.040	0.040	0.040	0.040	0.050	0.040	0.050	0.040	0.050	0.040	-
Pb (mg/L)	0.2	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.010	0.050	0.010	0.010	-
Zn (mg/L)	0.5	0.010	0.010	0.010	0.010	0.010	0.010	0.020	0.040	0.010	0.010	0.030	-
Ra-226 (pCi/L)	10	-	-	-	-	-	-	-	-	-	-	-	-
pH	>6.0	7.5	7.8	7.7	9.8	7.9	7.9	7.9	7.8	7.8	7.9	7.7	-

Metal Mining Liquid Effluent Regulations (MMLER) & Guidelines (MMLEG)

Monthly Average Effluent Quality Data

Mine/Mill Name	Snip
Company Name	PRIME RESOURCES GROUP INC.
Operator Name	Homestake Canada Inc.
City	56 air miles North of Stewart
Province	British Columbia
Region	Pacific and Yukon
Latitude/Longitude	56 40 N / 131 05 W
Sector	Precious metals
Product	Gold-Silver
Regulatory Status	Regulations
Effluent Discharge Point	Sky Creek
Comments	

Parameters	Limits	January	February	March	April	May	June	July	August	Sep.	Oct.	Nov.	Dec.
Flow (m^3/month)	-	-	-	-	-	-	-	-	-	-	-	-	-
TSM (mg/L)	25	4.000	4.000	4.000	4.000	4.000	5.000	-	-	-	-	-	-
As (mg/L)	0.5	0.040	0.040	0.040	0.040	0.040	0.040	-	-	-	-	-	-
Cu (mg/L)	0.3	0.003	0.002	0.002	0.003	0.003	0.030	-	-	-	-	-	-
Ni (mg/L)	0.5	0.010	0.010	0.010	0.010	0.015	0.010	-	-	-	-	-	-
Pb (mg/L)	0.2	0.003	0.003	0.003	0.004	0.004	0.004	-	-	-	-	-	-
Zn (mg/L)	0.5	0.010	0.045	0.030	0.015	0.015	0.015	-	-	-	-	-	-
Ra-226 (pCi/L)	10	-	-	-	-	-	-	-	-	-	-	-	-
pH	>6.0	7.9	7.7	7.8	8.0	8.1	8.0	-	-	-	-	-	-

Metal Mining Liquid Effluent Regulations (MMLER) & Guidelines (MMLEG)

Monthly Average Effluent Quality Data

Mine/Mill Name	Strathcona (Moose Lake)
Company Name	FALCONBRIDGE LTD.
Operator Name	Falconbridge Ltd.
City	Onaping
Province	Ontario
Region	Ontario
Latitude/Longitude	46 40 N / 81 20.5 W
Sector	Base metals
Product	Nickel-Copper-Cobalt-Platinum-Palladium
Regulatory Status	Guidelines
Effluent Discharge Point	
Comments	

Parameters	Limits	January	February	March	April	May	June	July	August	Sep.	Oct.	Nov.	Dec.
Flow (m^3/d)	-	51840	58640	48900	288000	54700	72120	39720	33330	23910	29030	52850	65070
TSM (mg/L)	25	0.800	0.740	1.490	0.900	0.750	0.910	0.530	0.980	1.010	0.790	0.690	0.360
As (mg/L)	0.5	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Cu (mg/L)	0.3	0.035	0.030	0.030	0.030	0.030	0.030	0.030	0.040	0.015	0.030	0.030	0.020
Ni (mg/L)	0.5	0.060	0.050	0.090	0.050	0.050	0.050	0.040	0.050	0.060	0.070	0.060	0.040
Pb (mg/L)	0.2	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Zn (mg/L)	0.5	0.011	0.006	0.010	0.005	0.006	0.002	0.001	0.001	0.002	0.003	0.009	0.002
Ra-226 (pCi/L)	10	-	-	-	-	-	-	-	-	-	-	-	-
pH	>6.0	7.7	7.6	7.6	7.3	7.2	7.6	7.4	7.4	7.7	7.6	7.6	7.7

Metal Mining Liquid Effluent Regulations (MMLER) & Guidelines (MMLEG)

Monthly Average Effluent Quality Data

Mine/Mill Name	Sullivan
Company Name	COMINCO LTD.
Operator Name	Cominco Ltd.
City	Kimberley
Province	British Columbia
Region	Pacific and Yukon
Latitude/Longitude	49 42 N / 116 00 W
Sector	Base metals
Product	Zinc-Lead-Silver
Regulatory Status	Guidelines
Effluent Discharge Point	Kootenay
Comments	

Parameters	Limits	January	February	March	April	May	June	July	August	Sep.	Oct.	Nov.	Dec.
Flow (m^3/month)	-	803520	665280	624960	754140	629517	885600	825840	803520	864000	714240	592440	669600
TSM (mg/L)	25	12.200	7.400	9.300	7.500	4.700	7.600	16.800	8.200	23.000	3.600	5.500	6.100
As (mg/L)	0.5	0.002	0.001	0.006	0.010	0.001	0.004	0.001	0.001	0.001	0.003	0.010	0.010
Cu (mg/L)	0.3	0.028	0.012	0.010	0.006	0.002	0.006	0.010	0.010	0.008	0.004	0.004	0.006
Ni (mg/L)	0.5	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Pb (mg/L)	0.2	0.050	0.016	0.022	0.026	0.020	0.030	0.040	0.020	0.044	0.020	0.008	0.022
Zn (mg/L)	0.5	**0.520**	0.280	0.310	0.270	0.150	0.180	**0.560**	0.220	0.440	0.080	0.150	0.240
Ra-226 (pCi/L)	10	-	-	-	-	-	-	-	-	-	-	-	-
pH	>6.0	9.3	9.1	9.3	9.0	9.2	8.9	9.4	9.2	9.3	9.1	9.2	9.2

Boxed data indicates that a monthly effluent quality standard (MEQS) was exceeded for that month.

Metal Mining Liquid Effluent Regulations (MMLER) & Guidelines (MMLEG)

Monthly Average Effluent Quality Data

Mine/Mill Name	Thayer Lindsley
Company Name	FALCONBRIDGE LIMITED
Operator Name	Falconbridge Limited
City	Falconbridge
Province	Ontario
Region	Ontario
Latitude/Longitude	46 30 N / 81 00 W
Sector	Base metals
Product	Nickel-Copper-Platinum
Regulatory Status	Regulations
Effluent Discharge Point	
Comments	No surface effluent

Parameters	Limits	January	February	March	April	May	June	July	August	Sep.	Oct.	Nov.	Dec.
Flow (m^3/d)	-	-	-	-	-	-	-	-	-	-	-	-	-
TSM (mg/L)	25	-	-	-	-	-	-	-	-	-	-	-	-
As (mg/L)	0.5	-	-	-	-	-	-	-	-	-	-	-	-
Cu (mg/L)	0.3	-	-	-	-	-	-	-	-	-	-	-	-
Ni (mg/L)	0.5	-	-	-	-	-	-	-	-	-	-	-	-
Pb (mg/L)	0.2	-	-	-	-	-	-	-	-	-	-	-	-
Zn (mg/L)	0.5	-	-	-	-	-	-	-	-	-	-	-	-
Ra-226 (pCi/L)	10	-	-	-	-	-	-	-	-	-	-	-	-
pH	>6.0	-	-	-	-	-	-	-	-	-	-	-	-

Metal Mining Liquid Effluent Regulations (MMLER) & Guidelines (MMLEG)

Monthly Average Effluent Quality Data

Mine/Mill Name	Thompson Complex & Birchtree
Company Name	INCO LIMITED
Operator Name	INCO Limited
City	Thompson
Province	Manitoba
Region	Prairie and Northern
Latitude/Longitude	55 42 N / 97 55 W
Sector	Base metals
Product	Nickel-Copper
Regulatory Status	Guidelines
Effluent Discharge Point	T3 Culvert
Comments	

Parameters		Limits	January	February	March	April	May	June	July	August	Sep.	Oct.	Nov.	Dec.
Flow	(m^3/month)	-	1543000	1058000	1543000	1534000	2591000	2121000	1797000	1854000	1792000	1732000	1577000	1546000
TSM	(mg/L)	25	11.250	23.750	7.250	13.000	2.750	2.000	1.000	3.000	2.200	1.500	3.750	3.200
As	(mg/L)	0.5	-	-	-	-	-	-	-	-	-	-	-	-
Cu	(mg/L)	0.3	-	-	-	-	-	-	-	-	-	-	-	-
Ni	(mg/L)	0.5	0.170	0.203	0.173	0.440	0.180	0.133	0.138	0.140	0.162	0.193	0.208	0.216
Pb	(mg/L)	0.2	-	-	-	-	-	-	-	-	-	-	-	-
Zn	(mg/L)	0.5	-	-	-	-	-	-	-	-	-	-	-	-
Ra-226	(pCi/L)	10	-	-	-	-	-	-	-	-	-	-	-	-
pH		>6.0	7.0	7.2	7.1	7.1	8.2	9.0	8.0	8.0	8.1	7.9	7.6	7.4

Metal Mining Liquid Effluent Regulations (MMLER) & Guidelines (MMLEG)

Monthly Average Effluent Quality Data

Mine/Mill Name	Thompson Mill
Company Name	INCO LIMITED
Operator Name	INCO Limited
City	Thompson
Province	Manitoba
Region	Prairie and Northern
Latitude/Longitude	55 42 N / 97 55 W
Sector	Base metals
Product	Nickel-Copper
Regulatory Status	Guidelines
Effluent Discharge Point	Tailings Pond Discharged to Misery Lake
Comments	

Parameters	Limits	January	February	March	April	May	June	July	August	Sep.	Oct.	Nov.	Dec.
Flow (m^3/month)	-	2578067	2578067	2653893	2729718	4701181	3791275	3108846	1896000	1896000	1819812	1819812	1895638
TSM (mg/L)	25	2.750	1.667	1.250	3.000	2.750	6.333	3.800	4.000	6.750	2.000	4.000	2.500
As (mg/L)	0.5	-	-	-	-	-	-	-	-	-	-	-	-
Cu (mg/L)	0.3	-	-	-	-	-	-	-	-	-	-	-	-
Ni (mg/L)	0.5	0.360	0.360	0.340	0.348	0.283	0.220	0.166	0.150	0.185	0.197	0.225	0.265
Pb (mg/L)	0.2	-	-	-	-	-	-	-	-	-	-	-	-
Zn (mg/L)	0.5	-	-	-	-	-	-	-	-	-	-	-	-
Ra-226 (pCi/L)	10	-	-	-	-	-	-	-	-	-	-	-	-
pH	>6.0	7.3	7.1	7.0	7.2	7.8	8.0	8.1	8.5	8.3	8.1	8.0	7.7

Metal Mining Liquid Effluent Regulations (MMLER) & Guidelines (MMLEG)

Monthly Average Effluent Quality Data

Mine/Mill Name	Troilus
Company Name	INMET MINING CORPORATION
Operator Name	Inmet Corporation
City	175 km North of Chibougamau
Province	Quebec
Region	Quebec
Latitude/Longitude	51 00 N / 74 30 W
Sector	Precious metals
Product	Gold-Copper
Regulatory Status	Regulations
Effluent Discharge Point	PR-1
Comments	

Parameters		Limits	January	February	March	April	May	June	July	August	Sep.	Oct.	Nov.	Dec.
Flow	(m^3/d)	-	19310	29232	24768	19203	0	0	18694	6124	8060	21840	0	16774
TSM	(mg/L)	25	24.000	24.000	15.000	18.000	-	-	**28.000**	15.000	23.000	**56.000**	-	13.000
As	(mg/L)	0.5	-	-	0.010	-	-	-	-	-	-	0.020	-	0.040
Cu	(mg/L)	0.3	0.050	0.010	0.010	0.040	-	-	0.010	-	0.010	0.020	-	0.040
Ni	(mg/L)	0.5	0.020	0.010	0.010	0.010	-	-	0.020	-	0.010	0.010	-	0.010
Pb	(mg/L)	0.2	0.010	0.010	0.002	0.020	-	-	0.010	-	0.010	0.010	-	0.010
Zn	(mg/L)	0.5	0.010	0.010	0.001	0.010	-	-	0.010	-	0.050	0.030	-	0.060
Ra-226	(pCi/L)	10	-	-	-	-	-	-	-	-	-	-	-	-
pH		>6.0	8.5	8.1	7.8	7.5	-	-	8.2	8.3	8.8	7.6	-	7.6

Boxed data indicates that a monthly effluent quality standard (MEQS) was exceeded for that month.

Metal Mining Liquid Effluent Regulations (MMLER) & Guidelines (MMLEG)

Monthly Average Effluent Quality Data

Mine/Mill Name	Troilus
Company Name	INMET MINING CORPORATION
Operator Name	Inmet Corporation
City	175 km North of Chibougamau
Province	Quebec
Region	Quebec
Latitude/Longitude	51 00 N / 74 30 W
Sector	Precious metals
Product	Gold-Copper
Regulatory Status	Regulations
Effluent Discharge Point	BS-2
Comments	

Parameters		Limits	January	February	March	April	May	June	July	August	Sep.	Oct.	Nov.	Dec.
Flow	(m^3/d)	-	6595	6624	5184	6048	2880	6941	4035	3157	2923	3644	4112	2996
TSM	(mg/L)	25	16.000	15.000	6.000	19.000	8.000	11.000	8.000	22.000	17.000	14.000	18.000	8.000
As	(mg/L)	0.5	-	-	0.050	-	-	-	-	-	-	0.050	-	-
Cu	(mg/L)	0.3	0.150	0.060	0.020	0.030	0.057	0.050	0.110	0.030	0.080	0.030	0.010	0.040
Ni	(mg/L)	0.5	0.050	0.010	0.010	0.010	0.005	0.010	0.020	0.010	0.010	0.010	0.010	0.010
Pb	(mg/L)	0.2	0.010	0.010	0.010	0.030	0.005	0.050	0.010	0.010	0.010	0.010	0.010	0.010
Zn	(mg/L)	0.5	0.030	0.020	0.020	0.030	0.030	0.010	0.010	0.020	0.060	0.010	0.010	0.010
Ra-226	(pCi/L)	10	-	-	-	-	-	-	-	-	-	-	-	-
pH		>6.0	7.7	7.7	7.3	7.3	7.7	7.7	8.0	7.9	7.8	6.5	7.8	7.9

Metal Mining Liquid Effluent Regulations (MMLER) & Guidelines (MMLEG)

Monthly Average Effluent Quality Data

Mine/Mill Name	Trout Lake
Company Name	HUDSON BAY MINING AND SMELTING CO., LTD
Operator Name	Hudson Bay Mining and Smelting Co. Ltd
City	Near Flin Flon
Province	Manitoba
Region	Prairie and Northern
Latitude/Longitude	54 50 N / 101 49 W
Sector	Base metals
Product	Copper-Zinc-Gold-Silver
Regulatory Status	Regulations
Effluent Discharge Point	Treatment Plant Discharge
Comments	

Parameters	Limits	January	February	March	April	May	June	July	August	Sep.	Oct.	Nov.	Dec.
Flow (m^3/month)	-	24100	19100	24700	25600	28900	31000	32400	2300	7700	8300	25300	25500
TSM (mg/L)	25	22.250	24.000	18.000	19.250	16.500	22.400	**25.500**	22.000	24.500	24.000	20.000	22.000
As (mg/L)	0.5	0.004	0.004	0.002	0.003	0.001	0.003	0.001	-	0.001	0.003	0.004	0.005
Cu (mg/L)	0.3	0.015	0.010	0.013	0.010	0.010	0.012	0.020	-	0.015	0.010	0.013	0.010
Ni (mg/L)	0.5	0.010	0.010	0.010	0.010	0.010	0.010	0.010	-	0.010	0.010	0.010	0.010
Pb (mg/L)	0.2	0.040	0.040	0.040	0.040	0.040	0.040	0.040	-	0.040	0.040	0.040	0.040
Zn (mg/L)	0.5	0.080	0.060	0.028	0.018	0.010	0.020	0.045	0.040	0.075	0.130	0.090	0.044
Ra-226 (pCi/L)	10	-	-	-	-	-	-	-	-	-	-	-	-
pH	>6.0	10.0	9.8	9.8	9.6	9.9	9.6	9.9	10.3	9.2	8.7	9.6	9.9

Boxed data indicates that a monthly effluent quality standard (MEQS) was exceeded for that month.

Metal Mining Liquid Effluent Regulations (MMLER) & Guidelines (MMLEG)

Monthly Average Effluent Quality Data

Mine/Mill Name	Wabush
Company Name	STELCO INC.
Operator Name	Cleveland-Cliffs Inc.
City	Wabush
Province	Newfoundland
Region	Atlantic
Latitude/Longitude	52 55 N / 67 10 W
Sector	Iron
Product	Iron
Regulatory Status	Guidelines
Effluent Discharge Point	East Pit No.1
Comments	

Parameters	Limits	January	February	March	April	May	June	July	August	Sep.	Oct.	Nov.	Dec.
Flow (m^3/month)	-	-	-	-	-	-	-	-	-	-	-	-	-
TSM (mg/L)	25	0.740	0.310	0.300	0.930	0.540	1.400	10.400	5.710	0.460	18.600	2.720	1.580
As (mg/L)	0.5	-	-	-	-	-	-	-	-	-	-	-	-
Cu (mg/L)	0.3	-	-	-	-	-	-	-	-	-	-	-	-
Ni (mg/L)	0.5	-	-	-	-	-	-	-	-	-	-	-	-
Pb (mg/L)	0.2	-	-	-	-	-	-	-	-	-	-	-	-
Zn (mg/L)	0.5	-	-	-	-	-	-	-	-	-	-	-	-
Ra-226 (pCi/L)	10	-	-	-	-	-	-	-	-	-	-	-	-
pH	>6.0	6.7	6.3	6.2	6.4	6.5	6.7	6.3	6.6	6.3	6.3	6.2	6.7

Metal Mining Liquid Effluent Regulations (MMLER) & Guidelines (MMLEG)

Monthly Average Effluent Quality Data

Mine/Mill Name	Wabush
Company Name	STELCO INC.
Operator Name	Cleveland-Cliffs Inc.
City	Wabush
Province	Newfoundland
Region	Atlantic
Latitude/Longitude	52 55 N / 67 10 W
Sector	Iron
Product	Iron
Regulatory Status	Guidelines
Effluent Discharge Point	East Pit No. 2
Comments	

Parameters	Limits	January	February	March	April	May	June	July	August	Sep.	Oct.	Nov.	Dec.
Flow (m^3/month)	-	-	-	-	-	-	-	-	-	-	-	-	-
TSM (mg/L)	25	0.480	-	-	3.020	3.000	1.330	2.500	2.900	0.990	9.820	1.130	1.060
As (mg/L)	0.5	-	-	-	-	-	-	-	-	-	-	-	-
Cu (mg/L)	0.3	-	-	-	-	-	-	-	-	-	-	-	-
Ni (mg/L)	0.5	-	-	-	-	-	-	-	-	-	-	-	-
Pb (mg/L)	0.2	-	-	-	-	-	-	-	-	-	-	-	-
Zn (mg/L)	0.5	-	-	-	-	-	-	-	-	-	-	-	-
Ra-226 (pCi/L)	10	-	-	-	-	-	-	-	-	-	-	-	-
pH	>6.0	6.1	-	-	6.2	**5.7**	**5.6**	**5.8**	6.2	6.1	6.1	**5.8**	6.3

Boxed data indicates that a monthly effluent quality standard (MEQS) was exceeded for that month.

Metal Mining Liquid Effluent Regulations (MMLER) & Guidelines (MMLEG)

Monthly Average Effluent Quality Data

Mine/Mill Name	Wabush
Company Name	STELCO INC.
Operator Name	Cleveland-Cliffs Inc.
City	Wabush
Province	Newfoundland
Region	Atlantic
Latitude/Longitude	52 55 N / 67 10 W
Sector	Iron
Product	Iron
Regulatory Status	Guidelines
Effluent Discharge Point	South Pit
Comments	

Parameters	Limits	January	February	March	April	May	June	July	August	Sep.	Oct.	Nov.	Dec.
Flow (m^3/month)	-	-	-	-	-	-	-	-	-	-	-	-	-
TSM (mg/L)	25	0.560	0.230	0.230	7.100	0.320	1.800	7.100	9.990	11.650	**32.100**	7.200	2.810
As (mg/L)	0.5	-	-	-	-	-	-	-	-	-	-	-	-
Cu (mg/L)	0.3	-	-	-	-	-	-	-	-	-	-	-	-
Ni (mg/L)	0.5	-	-	-	-	-	-	-	-	-	-	-	-
Pb (mg/L)	0.2	-	-	-	-	-	-	-	-	-	-	-	-
Zn (mg/L)	0.5	-	-	-	-	-	-	-	-	-	-	-	-
Ra-226 (pCi/L)	10	-	-	-	-	-	-	-	-	-	-	-	-
pH	>6.0	6.4	6.6	6.6	6.4	6.7	6.4	6.3	6.4	6.4	6.5	6.2	6.8

Boxed data indicates that a monthly effluent quality standard (MEQS) was exceeded for that month.

Metal Mining Liquid Effluent Regulations (MMLER) & Guidelines (MMLEG)

Monthly Average Effluent Quality Data

Mine/Mill Name	Whistle
Company Name	INCO LIMITED
Operator Name	Carman Construction
City	Copper Cliff
Province	Ontario
Region	Ontario
Latitude/Longitude	46 45 N / 80 52 W
Sector	Base metals
Product	Nickel-Copper-Cobalt
Regulatory Status	Regulations
Effluent Discharge Point	
Comments	

Parameters		Limits	January	February	March	April	May	June	July	August	Sep.	Oct.	Nov.	Dec.
Flow	(m^3/d)	-	111	201	936	247	302	758	958	845	793	583	722	328
TSM	(mg/L)	25	3.400	4.000	6.500	6.300	2.900	2.600	3.000	3.600	3.200	3.000	3.300	3.200
As	(mg/L)	0.5	0.001	0.001	0.001	0.001	0.001	0.010	0.010	0.010	0.010	0.010	0.010	0.010
Cu	(mg/L)	0.3	0.030	0.020	0.040	0.006	0.005	0.005	0.003	0.005	0.006	0.017	0.006	0.011
Ni	(mg/L)	0.5	0.499	0.223	**1.603**	0.065	0.046	0.080	0.046	0.057	0.059	0.146	0.090	0.165
Pb	(mg/L)	0.2	0.015	0.018	0.015	0.015	0.013	0.009	0.004	0.002	0.002	0.004	0.003	0.002
Zn	(mg/L)	0.5	0.016	0.006	0.018	0.007	0.010	0.005	0.007	0.016	0.007	0.010	0.004	0.011
Ra-226	(pCi/L)	10	-	-	-	-	-	-	-	-	-	-	-	-
pH		>6.0	7.1	7.8	7.2	8.0	7.5	7.9	8.6	8.7	8.0	8.6	8.8	8.5

Boxed data indicates that a monthly effluent quality standard (MEQS) was exceeded for that month.

Metal Mining Liquid Effluent Regulations (MMLER) & Guidelines (MMLEG)

Monthly Average Effluent Quality Data

Mine/Mill Name	Winston Lake Division
Company Name	INMET MINING CORPORATION
Operator Name	Inmet Mining Corporation
City	220 km East of Thunder Bay
Province	Ontario
Region	Ontario
Latitude/Longitude	48 58 N / 87 22 W
Sector	Base metals
Product	Zinc-Copper
Regulatory Status	Regulations
Effluent Discharge Point	
Comments	

Parameters		Limits	January	February	March	April	May	June	July	August	Sep.	Oct.	Nov.	Dec.
Flow	(m^3/d)	-	-	-	-	-	-	-	-	-	-	-	-	-
TSM	(mg/L)	25	3.000	4.000	6.000	6.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000	3.000
As	(mg/L)	0.5	0.001	0.001	0.002	0.001	0.009	0.010	0.010	0.012	0.010	0.010	0.010	0.010
Cu	(mg/L)	0.3	0.024	0.011	0.039	0.009	0.006	0.005	0.003	0.005	0.007	0.013	0.006	0.011
Ni	(mg/L)	0.5	**0.523**	0.303	**1.632**	0.166	0.048	0.080	0.044	0.054	0.054	0.114	0.081	0.153
Pb	(mg/L)	0.2	0.018	0.016	0.015	0.017	0.013	0.005	0.003	0.002	0.002	0.005	0.003	0.002
Zn	(mg/L)	0.5	0.015	0.006	0.017	0.006	0.020	0.008	0.006	0.011	0.007	0.008	0.003	0.011
Ra-226	(pCi/L)	10	-	-	-	-	-	-	-	-	-	-	-	-
pH		>6.0	6.9	7.9	7.0	8.4	8.2	8.6	8.8	8.8	8.5	8.6	8.0	8.5

Boxed data indicates that a monthly effluent quality standard (MEQS) was exceeded for that month.