SAMPLING AND MONITORING DATA FROM THE MINE DOYON SOUTH WASTE ROCK DUMP (1990 TO 1995)

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GROUPE DE RECHERCHE EN GÉOLOGIE DE L'INGÉNIEUR

RAPPORT GREGI 93-05

MONITORING OF ACID MINE DRAINAGE: CHEMICAL DATA FROM LA MINE DOYON – SOUTH WASTE ROCK DUMP

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ABSTRACT

Acid drainage from the South Dump of Mine Doyon in Quebec was first noted in 1985, and levels of contaminants continued to increase through 1988. Although the South Dump does not have a high sulphide content (3-5%) it is estimated that 50% of the waste rock dump is composed of highly reactive sericitic schists. An exhaustive monitoring program was initiated in the summer of 1990, and has included analysis of leachate coming from below and around the dump. The chemical data generated are described in the report.

The report is a compilation of all chemical and mineralogical data from the South Dump of Mine Doyon which have been gathered and analyzed to date. The data is organized in five sections: chemical analyses of sampled leachate; a discussion of water quality in the unsaturated zone; mass balance calculations based on chemical data; chemical composition calculations based on common physical parameters; and data obtained prior to 1991. The parameters measured and discussed herein include: flow measurements; total dissolved solids; effluent density; conductivity; pH; acidity; sulphate; iron; and a wide range of associated metals.

RÉSUMÉ

Un drainage acide à partir de la halde de stériles sud à la mine Doyon (Québec) a été signalé pour la première fois en 1985 et les concentrations des contaminants ont continué d'augmenter jusqu'à la fin de 1988. Même si la teneur en sulfures de la halde sud n'est pas élevée (entre 3 et 5 %), on évalue que 50 % de la halde de stériles est composé des schistes séricitiques très réactifs. Un programme de surveillance exhaustif a été entrepris au cours de l'été de l990; il incluait une analyse du lixiviat s'écoulant au-dessous et autour de la halde. Les données chimiques recueillies sont présentées dans la rapport.

La rapport est une compilation de toutes les données chimiques et minéralogiques sur la halde sud de la mine Doyon qui ont été recueillies et analysées à ce jour. Les données sont réparties dans cinq sections: analyses chimiques d'échantillons de lixiviat; discussion de la qualité de l'eau dans la zone non saturée; calculs du bilan massique basés sur les données chillliques; calculs de la composition chimique basés sur les paramètres physiques courants; et données obtenus avant l991. Les paramètres mesurés et traités dans le présent document portent notamment sur les écoulements, les quantités totales de matières solides dissoutes; la densité des effluents; la conductivité; le pH; l'acidité; les teneurs en sulfate, en fer et en plusieurs métaux associés.

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Introduction

This report is a compilation of chemical and mineralogical data gathered to this date from Phases I and II of the acid mine drainage evaluation program at the South Dump of La Mine Doyon. The data is organized in five sections.

1. Analyses of leachate from monitoring wells within dump (1.1), analyses of leachate from ditch monitoring stations (1.2), and analyses of leachate from lysimeters (1.3).
2. Discussion on the water quality in the unsaturated zone of the dump.
3. Mass balance calculations from chemical data.
4. A brief description of relationships used to calculate chemical composition of the leachate from simple key parameters.
5. Chemical data from monitoring stations prior to 1991.

1. Chemical data

1.1 Chemical data from monitoring wells

Analytical results for all samples collected in the monitoring wells from March 1991 to date are presented in Appendix A. Many of the values presented are "calculated" (see section 4.). Those values are clearly identified in the tables.

1.2 Chemical data from ditch monitoring stations

This section is divided in two sub-sections. Appendix B-1 contains chemical data for the leachate collected weekly at monitoring stations 510, 511 and 512 (see Fig. 1 for location) since January 1991. From 1992, only key parameters (pH, E_H, specific gravity SG, TDS and conductivity) have been measured on these samples. All other major constituents were calculated (see section 4.). During the spring thaw of 1992, a special sampling program was started. At each monitoring station, samples were taken at a rate of 1 per 500 m^3 of effluent flow. This sampling rate was maintained from April to July. From July to November, the rate was 1 sample per 2 days. Nearly 500 samples were collected during this special sampling program. The analytical results are presented in Appendix B-2.

1.3 Chemical data from lysimeters

During the summer of 1992, two groups of lysimeters were placed on the south dump. The group of lysimeters T-92-1 is located near exploratory trench T-3 (see Fig. 1), and the group T-92-2 is adjacent to borehole BH-91-6 (see Fig. 1). Each group of lysimeters is composed of six HDPE

half-barrels placed at three levels (~1.5, 2.5 and 4m depth). Installation details are given in the report GREGI 92-16[1]. Available chemical analyses are presented in Appendix C.

2. Stored acidity in unsaturated zone of dump

Drill samples collected from the dump during piezometer installation were leached under controlled conditions. The "dry" drilling method used allowed representative sampling of the dump without contamination from drilling fluid.

2.1 Leaching conditions.

Sample leaching was performed in three stages:

a. sample preparation
b. leaching
c. leachate analysis

Sample preparation was kept to a minimum, which involved separation of a representative <2 mm fraction. To recover 100 g of <2 mm, the whole sample was sieved to 2 mm, and a sample splitter was used to recover the weight fraction needed.

Leaching was done by mixing a 25 g sub-sample (<2mm) with 50 ml of distilled water under constant agitation for 30 min. Preliminary tests showed that consistent results could be obtained with 15 min. of agitation on a wrist-action agitator. Settling of the particles was then allowed prior to recovery of the supernatant leachate. The leachate was then filtered with a 0.45 mm membrane filter.

The leachate from over 100 leach tests was analyzed for pH, E_H, specific gravity (SG), conductivity and total dissolved solids (TDS). Results of these analyses, as well as calculated values for acidity, iron and sulfate are presented in Appendix D-1. From the calculated acidity, a mass of "available acid" was calculated on a dry basis (kg acid/ton of rock). A mean value was calculated for each borehole.

2.2 Water quality in the unsaturated zone and in the piezometers

The acidity of the leachate measured from piezometers inside the dump ranges from 1,000 to 115,000 mg/l (eq. $CaCO_3$). At each piezometer, there is no significant difference between the acidity measured at the interface between the dump and the underlying overburden and in the

[1] Lefebvre, R. (1992). Halde Sud de la Mine Doyon - Phase II. Rapport de Terrain - Été 1992. Rapport GREGI-1992-16. Groupe de Recherche en Géologie de l'Ingénieur. Département de Géologie. Université Laval.

bedrock below. The only exception is BH-04 which shows 1,000 mg/l acidity at the base of the dump, and 56,000 mg/l in the bedrock. Also, no important variation in acidity was noted from March 1991 to August 1992 with the exception of BH-01 Soil, which showed an increase in acidity from 3,000 to 28,000 mg/l through that period. Acidity in the two levels of that piezometer is now equal.

To evaluate the quality of the leachate in the unsaturated zone, results from the leaching procedure of drill samples were used. Since the original water content of each sample is unknown, acidity was calculated using a water content of 5,7%, which is the mean water content of the dump. Calculated acidity values of the water in the unsaturated zone are presented in the last column of each table in Appendix D-1 and in Figure 5. Figure 5 also shows, for each borehole, the relationship between these calculated acidity values and the measured values from the piezometers.

There is no clear relationship between the leachate composition in the unsaturated and saturated zones. In the unsaturated zone, considerable variations are observed between samples from the same borehole. In BH-01, acidity starts low near the surface and reaches a maximum between 5m and 12m depth. Below that depth there is a gradual decrease towards negligible values. Water acidity in the saturated zone for that borehole reaches 25,000 mg/l. Boreholes BH-02 and BH-03 are located in a part of the dump known as the "very low grade stock pile". This pile is stratified in two zones of different rock types. In the first 15 to 20m from the top of the pile, volcaniclastic rocks are the dominant lithology. These rocks do not generate acid at the same rate as the sericitic schist and this is reflected by the very low acidity measured in the first 20m of these two boreholes. Underlying this rock unit, sericitic schists are present and acidity rises accordingly. However, in BH-02, acidity drops to a negligible value near the base of the dump whereas in the piezometers, acidity is near 70,000 mg/l. In BH-03, acidity in the piezometers and in the samples near the base of the dump is high and nearly equal. In BH-04, there is a sharp acidity increase in the first meters of the dump followed by a constant decrease towards the base. In the soil piezometer of this borehole, acidity is negligible whereas in the underlying rock, it is 55,000 mg/l. BH-05 does not extend to the base of the dump. However, being in one of the oldest part of the dump, and rich in sericite schists, record calculated acidity of 418,000 mg/l is observed in the sample from 3m depth. In BH-06, calculated acidity is extremely variable. In the piezometers of this borehole, values over 100,000 mg/l are measured.

From the data presented, it is clear that acid generation within the dump does not follow a simple pattern. The nature of the dump material (reactive and unreactive lithologies, the presence of overburden) and its construction history (disposition of different rock types, construction technique, particularly the presence of dense or less permeable zones corresponding to driveways) influence the flow direction. Horizontal flow over short or medium distances is probably important. Also, the capacity of the dump to store acid in the unsaturated zone seems to be very important as indicated by the high values measured, some being well over the highest measured value in the piezometers or in the ditches.

2.3 Mineralogical analysis

The same samples described in section 2.1 were analyzed by X-ray diffraction. For each mineral species observed, a characteristic reflection was chosen and its surface measured. The largest surface measured for each mineral species was given an arbitrary value of 100 and all other surfaces were normalized with respect to this reflection. This procedure was not intended to provide absolute percentage values but merely to allow a vertical comparison basis of one particular mineral. The results are presented in Appendix D-2.

3. Mass balance calculations

3.1 Mass output at the weir monitoring stations

Flow at each weir station has been monitored since 1991. The cumulative volume is read at least weekly and often at intervals of a few days. A sample is taken weekly for chemical analysis. Chemical mass balance of the total mass output of the dump via the collecting ditches was calculated on a weekly basis using flow and weekly chemical data. Appendix E is divided into two sections. Appendix E-1 presents the flow data at each station on a daily, weekly and monthly basis. Missing values from the daily flow section were estimated from a theoretical uniform weekly flow. Appendix E-2 presents the mass balance of iron and sulfate at each station on a weekly basis.

3.2 Relationship between acid production rate, acid recovered in the ditches and acid stored in the dump

To evaluate the acid retention capacity of the dump, and therefore evaluate the present acid generation and storage within the dump and losses in the ditches, data from three sources was combined. For calculations, sulfate was used as indicator. Sulfate production within the dump was established using the heat produced by pyrite oxidation[2]. Sulfate storage (sulfate present in the dump at the time of sampling) was measured by leaching soluble sulfates from the drill samples, and the net output of sulfate in the ditches was measured directly at the monitoring stations (Table 1).

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[2] Lefebvre, R., Gélinas, P. and Isabel, D. Heat transfer during acid mine drainage production in a waste rock dump, La Mine Doyon (Québec). Rapport GREGI-1993-03. Groupe de Recherche en Géologie de l'Ingénieur, Département de Géologie, Université Laval.

From the data, it is clear that the dump is presently adding to storage each year two thirds of its sulfate production. From the yearly sulfate production of 26,300 T, only 9,000 T are collected in the ditches. Since the loss of leachate by other means (infiltration under the dump) is thought to be low, the change in sulfate storage is over 17,000 T/year in the dump. By the leaching procedure, it is estimated that the present total sulfate storage in the dump is 126,000 T. At the actual rate of storage of 17,000 T/year, it represents 7 years of active oxidation. Since the dump was erected in 1983 and that acidic conditions were detected early, the figures quoted are of the right order of magnitude. The present rate of pyrite oxidation is 16,443 T/year, merely 1% of the total estimated initial mass of pyrite (1,471,394 T).

Table 1. Sulfate Mass Balance

Present sulfate production in the dump[2]		
Mass of pyrite oxidized (T/year)		16,443
Annual sulfate production (T/year)		26,309
Stored soluble sulfate (mean values for boreholes 1,2,4,5 and 6)		
Water used in the leaching procedure (ml)		50
Solid used in the leaching procedure (g)	25	
Mean sulfate concentration in the leachate (mg/l)		2999
Sulfate mass by total solid mass (g/g)		0.005998
Total dump mass (T)		21,019,910
Stored soluble sulfate in the dump (T)	126,077	
Sulfate discharge in the ditches (mean values 1991-1992)		
Total volume of effluents in the ditches (m^3/year)		203,864
Mean sulfate concentration (mg/l)		44,525
Sulfate mass flow (T/year)		9,077
Present sulfate storage rate in the dump (T/year)		17,232

[2] Lefebvre, R., Gélinas, P. and Isabel, D. Heat transfer during acid mine drainage production in a waste rock dump, La Mine Doyon (Québec). Rapport GREGI-1993-03. Groupe de Recherche en Géologie de l'Ingénieur, Département de Géologie, Université Laval.

4. Relationships used to calculate chemical composition of the leachate

Many of the samples were only analyzed for TDS, conductivity, pH and E_H. The chemical composition of the samples was calculated from TDS or conductivity data. The basis for this procedure is outlined in Appendix A. The relationships used are presented in Tables 2 and 3 also in Appendix A. For TDS > 25,000 mg/l, curve set #1 (Table 2a) is used, and for TDS < 25,000 mg/l, curve set #2 (Table 2b) is used. When TDS is not available conductivity can be used (curve set #3, Table 3).

5. Historical data from ditch monitoring stations prior to 1991

Monitoring data prior to 1991 were available for three sampling points (D-301,302 and 309). Station D-301 was located in the southern portion of the eastern ditch, monitoring the leachate coming from the eastern part of the dump. Station D-302 was located in the northwest corner of the dump, approximately one hundred meters to the north-west of the actual monitoring station D-510. D-309 was located in the eastern part of the south ditch. Actual monitoring station D-511 collects the leachate from both east and south ditches.

Data from these stations are presented in Appendix F. The location of these stations is presented in Figure 1.

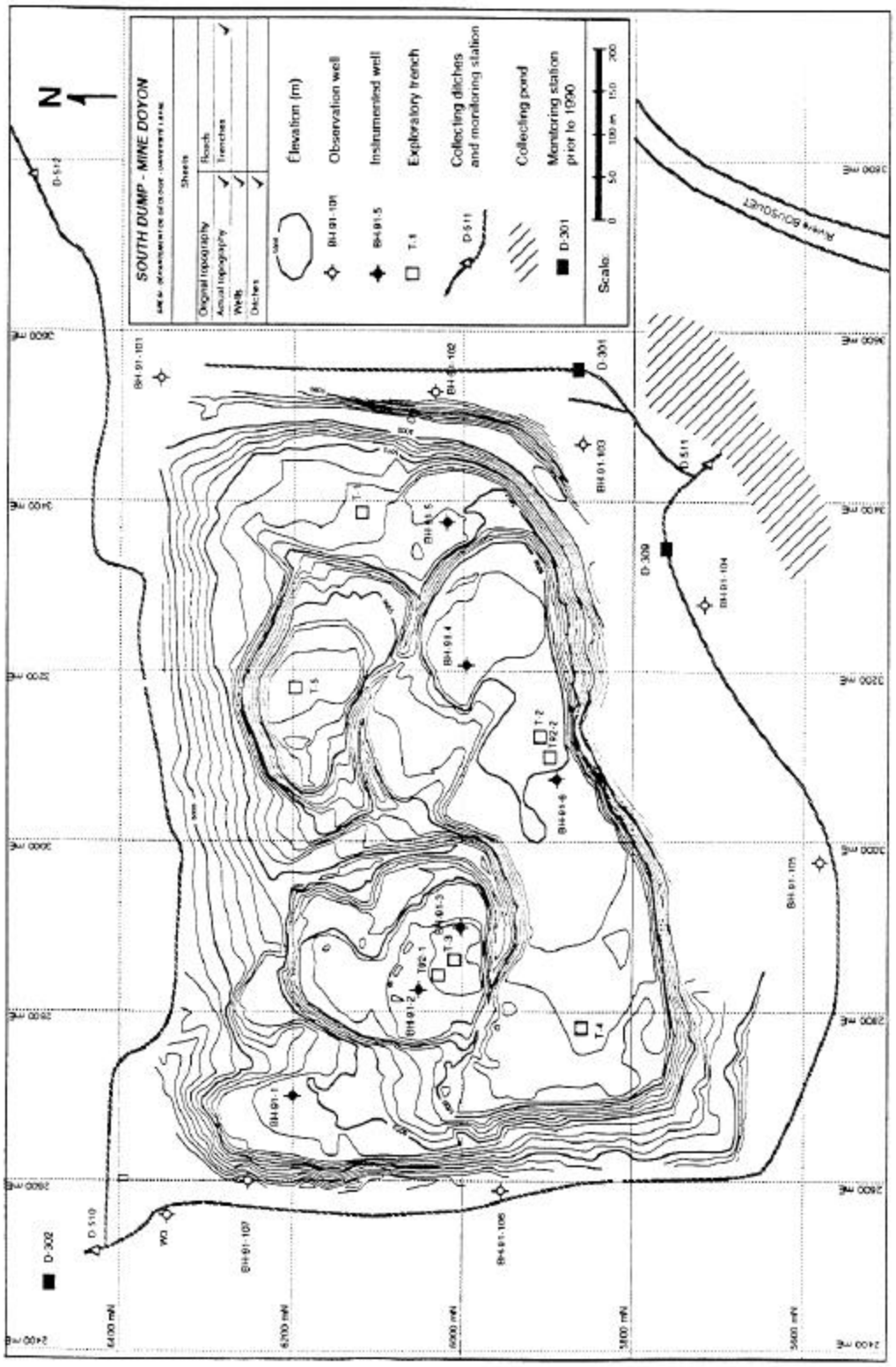


Figure 1. South Dump, Mine Doyon

Figure 1. South Dump, Mine Doyon

Figure 2. Weekly acidity measurements at the Weir stations

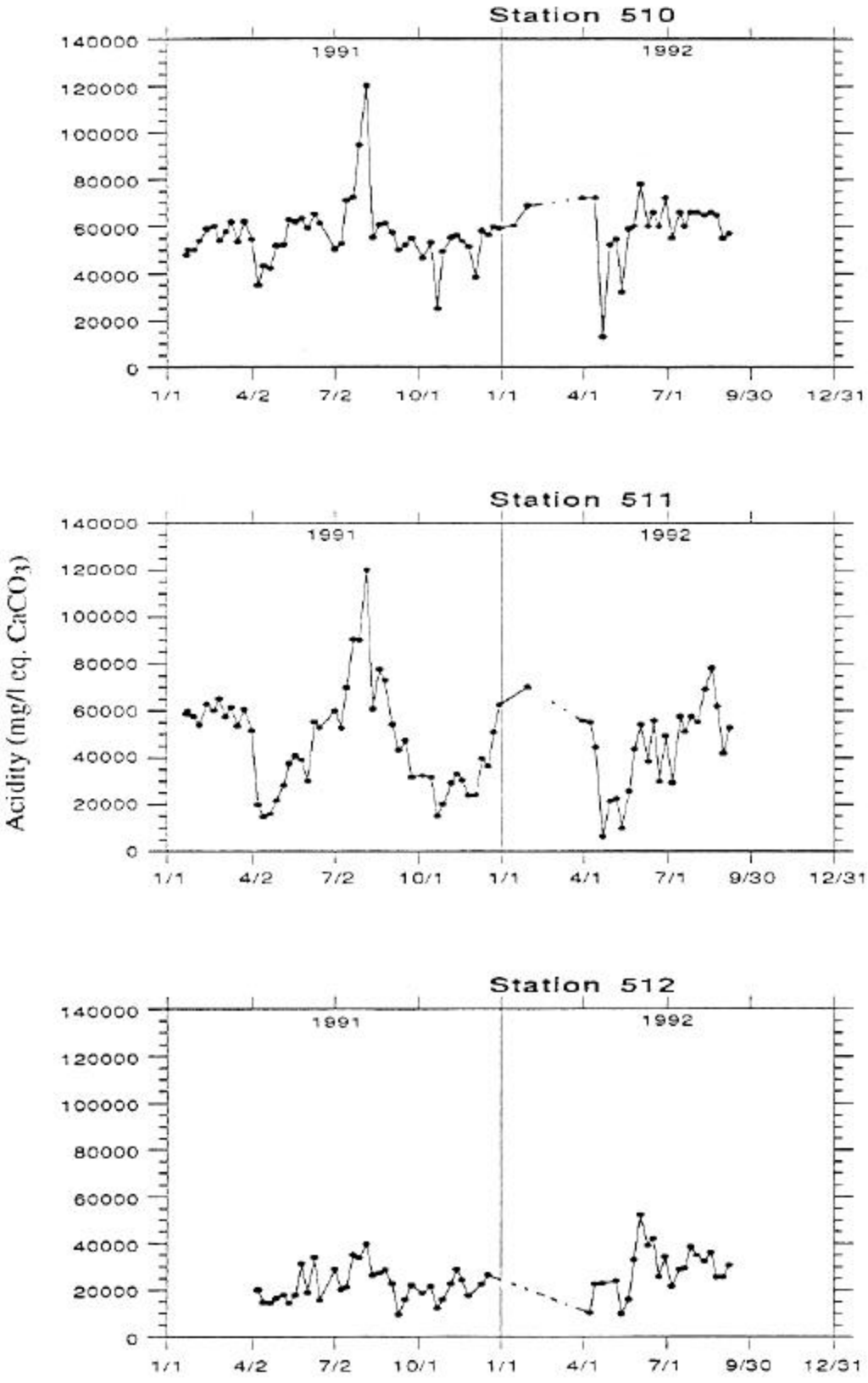


Figure 3. Acidity measurements at the weir stations (1992 close sampling program)

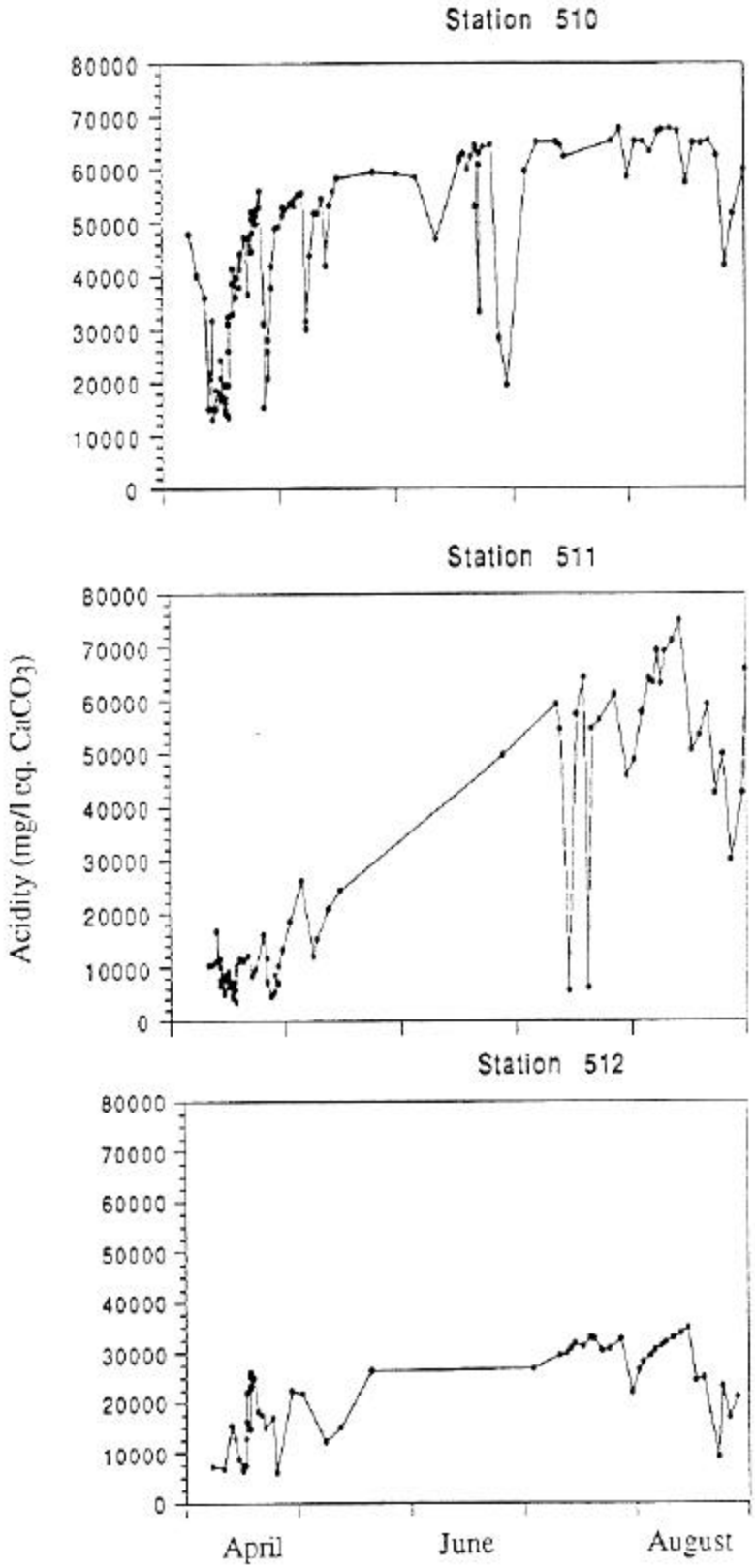
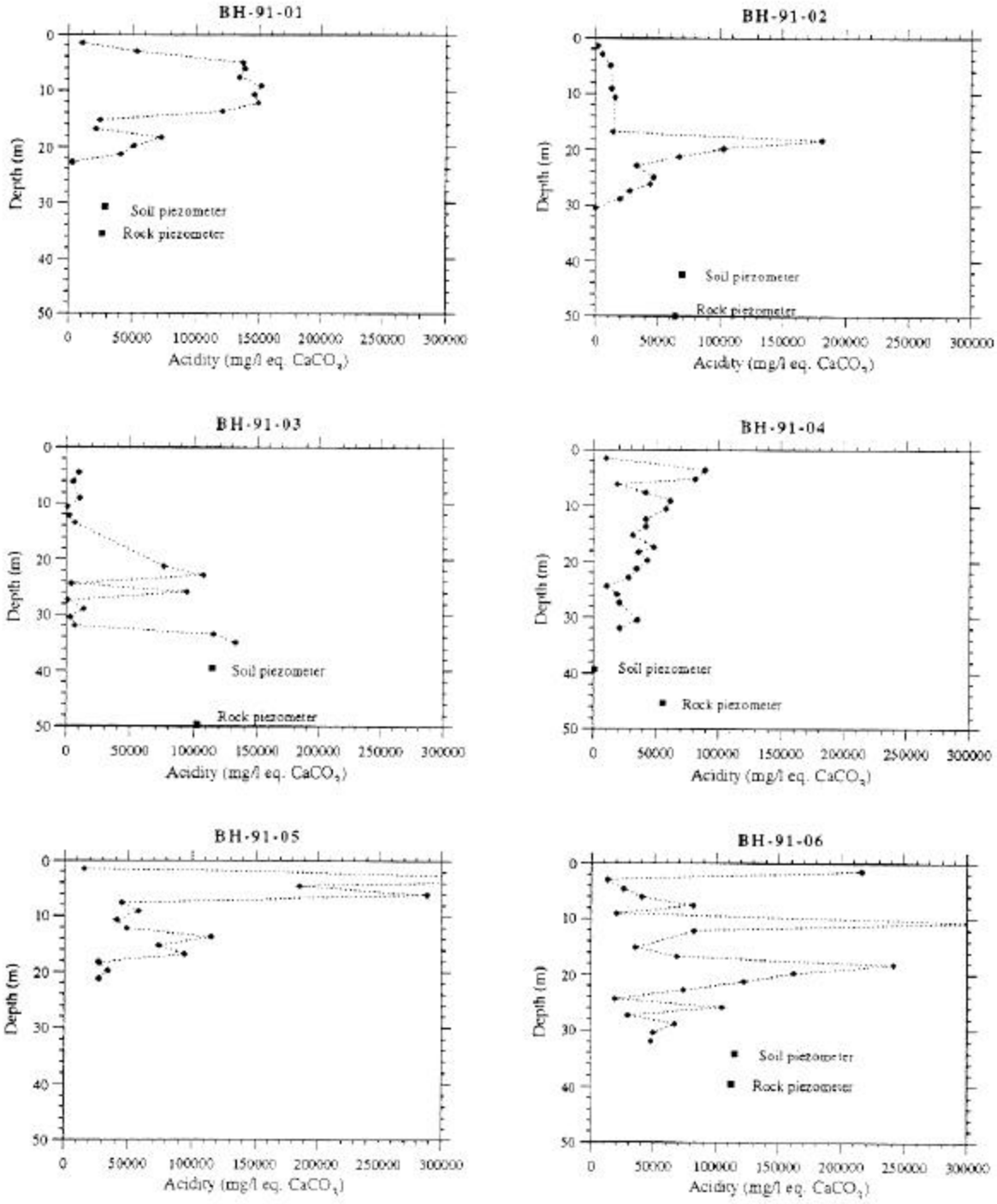


Figure 4. Calculated acidity in the borehole drill samples.



Appendix A

Two Rapid Methods to Evaluate Acid Mine Drainage Compositions: Total Dissolved Solids and Energy Dispersive X-Ray Fluorescence Spectroscopy

GREGI
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TWO RAPID METHODS TO EVALUATE ACID MINE DRAINAGE COMPOSITION: TOTAL DISSOLVED SOLIDS AND ENERGY DISPERSIVE X-RAY FLOURESCENCE SPECTROSCOPY

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ABSTRACT

This report describes two methods developed to rapidly evaluate the leachate quality in the waste rock dump. Monitoring of leachate from mine wastes affected by acidic drainage is generally done by conventional chemical analysis. Measurements include pH, electrical conductance, and determinations of acidity, sulphate, iron and other metals. Conventional chemical analysis is time consuming and the associated costs are often high. Two rapid methods for evaluating the AMD composition at the south waste rock pile of Mine Doyon have been developed. The first is a correlation method. Calibration curves correlating common physical parameters (total dissolved solids (TDS), conductivity) to values of acidity, sulphate, iron, and other metals were shown to be especially useful at Mine Doyon. The second method is based on energy dispersive X-ray fluorescence spectroscopy (EDXRF), which requires minimal sample preparation and is expected to have a high analytical throughput in the long term. These methods are described and applied to leachate data from the South Dump. The results are compared to conventional analytical results for sulphate, iron, aluminum, magnesium, and calcium. (Iron is the most important cation in these acidic waters, followed by aluminum and magnesium). Correlation values and method detection limits are reported.

RÉSUMÉ

Catte rapport décrit deux méthodes élaborées pour évaluer rapidement la qualité du lixiviat dans la halde de striles. La surveillance du lixiviat provenant de la halde affecté par le drainage acide est généralement réalisée par une analyse chimique classique. Les valeurs mesurées sont celles du pH, de la conductance électrique, de l'acidité ainsi que des teneurs en sulfate, en fer et en d'autres métaux. L'analyse chimique classique nécessite beaucoup de temps et les coûts associés sont souvent élevés. Deux méthodes rapides d'évaluation de la composition du DMA à la halde de stériles sud de la mine Doyon ont été élaborées. La première est une méthode de corrélation. Des courbes d'étalonnage corrélant les paramètres physiques courants (quantités totales de matières solides dissoutes, conductivité) aux valeurs de l'acidité, des concentrations en sulfate, en fer et en d'autres métaux se sont révélées particulièrement utiles à la mine Doyon. La seconde méthode est basé sur la spectroscopie par fluorescence X à dispersion d'énergie qui néessite une préparation minimale des échantillons et qui devrait produire à long terme des données analytiques de qualité. Ces méthodes sont décrites et appliquées aux données sur le lixiviat provenant de la halde sud. Les résultats sont comparés aux résultats des analyses classiques en ce qui concerne le sulfate, le fer, l'aluminiulm, le magnésium et le calcium. (Le fer est le cation le plus abondant dans ces eaux acides, suivi de l'aluminium et du magnésium). Les valeurs de corrélation et les limites de détection des méthodes sont présentées.

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1. Introduction

Monitoring of the chemical characteristics of leachate from mine wastes affected by AMD is generally done by conventional chemical analysis. Measurements include pH, electrical conductance (or conductivity) and analyses of acidity, sulfate, iron and other metals. Conventional chemical analysis is time consuming and the associated costs often limit the number of samples. In a recent project aimed at evaluating the AMD from the south waste rock pile of La Mine Doyon (Québec), two rapid methods for evaluating the AMD composition at that site were developed. The first method was aimed at two objectives: 1) to develop a reliable leachate evaluation field method and/or 2) to have a method able to evaluate a large number of samples at minimal costs. To achieve these objectives, values of acidity, sulfate, iron and other metals are derived from calibration curves established with measured parameters (conductivity, density, total dissolved solids). The second one is an analytic method designed to produce more precise results than the first one, to handle large numbers of samples, to be rapid and again to keep analitycal costs to a minimum. Energy dispersive X-ray fluorescence (EDXRF) has been selected for this task. Sample preparation is kept to a minimum, a simple dilution, and the throughput of the method (multielement analysis in 5 min.) keeps costs down.

Beaudoin and McMullen (1990)[1] summarized the acid generation problem at la Mine Doyon and the control measures now in place. Acid drainage from the south dump was first noted in 1985. The acid generation increased to its actual level in a short period of time, from 1985 to 1988. Acid generating rocks from the south dump do not have a high sulfide content, 3 to 5%. They are sericite schists and metavolcanic felsic and intermediates rocks. Sericite schist is the most acid generating rock type because of its ability, upon exposure to air and humidity, to split along schistosity planes, exposing fresh pyrite to oxidation. It is estimated that 50% of the south dump is composed of the highly reactive sericitic schists. The dump is located on a topographic high south of the main pit. The original sediments under the dump have a thickness ranging from 0 to 10 m and they are composed of till with zones of clayey silts. The dump configuration as well as its low permeability floor made possible the use of ditches to collect the leachate. At the present time, it is estimated that about 95% of the water infiltrating through the dump flows back into the ditches. The drainage is channelled into two collecting ponds and a dump where it is pumped to a treatment plant. Neutralization is achieved with lime under a patented process which produces high density sludges (40% solids).

Since the summer of 1990, an exhaustive monitoring program of the south dump is under way. Analysis of leachate coming from below and around the dump is done on samples coming from six boreholes penetrating the entire thickness of the dump, the underlying unconsolidated sediments and the upper part of the bedrock, along with eight other observation wells on the perimeter of the dump (Fig. 1, previous section). The boreholes in the dump have two sampling levels, one in the

[1] Beaudoin, P. et McMullen, J. 1990. L'approche environnementale pour le contrôle des effluents acides à la Mine Doyon. Colloque sur la réduction et le contrôle des effluents acides générés par les activités minières. Publié par le Centre de Recherches Minérales. Val-D'Or, le 28 novembre 1990. pp 85-95.

bedrock and the other at the limit between rock wastes and the original soil surface. Leachate from the ditches is also collected using automatic samplers.

2. Monitoring by Measurement of Total Dissolved Solids

2.1 Conventional chemical analysis

During the spring and summer of 1991, 69 samples were collected in the boreholes and 41 at the weir stations. These samples were all analyzed by conventional methods. Leachate analysis included measurements of the following parameters: acidity, conductivity, total dissolved solids (TDS), Eh and pH. Elemental analysis of Al, Ca, Fe (total, ferrous and ferric), K, Mg, Mn, Na and $SO_4^=$ species were performed. Metals such as Cd, Cu, Ni, Pb and Zn were also analyzed in some samples. Iron is the most important cation in these acidic waters, followed by aluminum and magnesium. Trace metals have no significant influence on mass budgets. Most analyses were performed according to procedures described by Taras *et al.* (1971)[2], including acidity, dissolved solids, $SO_4^=$ and Fe^{2+}. Fe^{3+} was calculated by difference between Fe^{2+} and total iron determined by AAS (atomic absorption spectroscopy). Acidity was measured by titration with NaOH to pH 8.3 and sulfates by barium sulfate precipitation or ion chromatography. All metals were analyzed by AAS. Density measurements were also performed on some samples with a precision hydrometer and/or a pycnometer. Analytical results are presented in Appendix A-1.

2.2 Relationships between elements and measured parameters

The parameters which better characterize the leachate are acidity, total iron and sulfate concentration. The correlation matrix of the elements and measured parameters (Table 1) shows clearly that these key parameters can be estimated from simple measurements. The highest correlations are obtained with TDS and conductivity ($r > 0,95$). Al and Mg, two other important constituents of the drainage are also highly correlated with TDS and conductivity. Calcium and pH are not well correlated to any of the parameters. E_H is not well correlated to any single parameter, however, good correlation is obtained with the $\log(Fe^{2+} / Fe^{3+})$, the dominant redox couple in these highly acidic waters. These correlations are significant to explain the processes of acid generation in the dump. Results indicate that leachate samples from the base of the dump and the ditches can be viewed as a single solution, showing more or less dilution. It is thus possible to establish relationships for the calculation of the concentration of major contributors like Fe, SO_4, Al, Mg and acidity based on simple parameter measurements such as TDS or conductivity.

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[2] Taras, M.J., Greenberg, A.E, Hoat, R.D. and Rand, M.C. Eds. 1971: Standards methods for the examination of water and wastewater, 13th ed. Amer. Public Health Ass., American Water Works Ass., Water Pollution Control Federation, New York, N.Y., 874 p.

Table 1. Parameters and elements correlation matrix

	Fe_{tot}	Acidity	TDS	SO_4	Conduc	pH	Ca	Al	SG*	Mg	Fe^{2+}	Fe^{3+}	E_H
Fe_{tot}	1												
Acidity	,971	1											
TDS	,978	,997	1										
SO_4	,973	,994	,998	1									
Conduct	,951	,958	,964	,959	1								
pH	-,409	-,402	-,377	-,354	-,380	1							
Ca	,734	,700	,723	,725	,804	-,257	1						
Al	,923	,979	,977	,977	,929	-,328	,665	1					
SG*	,971	,988	,998	,997	,949	-,855	,956	,977	1				
Mg	,931	,964	,970	,973	,937	-,233	,697	,965	,991	1			
Fe^{2+}	,800	,799	,819	,828	,819	-,029	,655	,822	,636	,876	1		
Fe^{3+}	,683	,636	,624	,604	,579	-,642	,419	,530	,936	,476	,108	1	
E_H	-,182	-,191	-,220	-,227	-,266	-,546	-,402	-,239	-,578	-,324	-,440	-,235	1
log(Fe2/Fe3)	,345	,353	,382	,392	,437	,429	,553	,404	637	,477	,465	-,213	-,917

*Specific Gravity: only 15/93 samples.

Relationships between TDS, conductivity and the other major parameters are presented in Figures 1 to 3 and in Table 2. Correlation curves using TDS were established for two ranges of TDS (over and under 25,000 mg/l TDS). Under 25,000 mg/l (especially between 0 and 10,000 mg/l), relationships established for the whole range of concentrations lead to unacceptable errors when calculating Fe, acidity, Al or SO_4. Since most of the samples in this range of concentration are coming from wells outside the dump, the typical "signature" of the leachate is lost. So other relationships had to be established for this range. These must be used with caution however, since factors other than dilution are here involved.

Table 2. Relationships between TDS, conductivity and leachate composition

A. Calculations from TDS (TDS > 25,000 mg/l)

Acidity	= (0,5945 * TDS) + ($4,29*10^{-7}$ * TDS^2)	r^2=1,00
Al	= (0,0335 * TDS) + ($6,53*10^{-8}$ * TDS^2)	r^2=0,98
Cond.	= (0,4153 * TDS) - ($5,34*10^{-4}$ * $TDS^{1,5}$)	r^2=0,99
Fe_{tot}	= (0,1581 * TDS) - ($1,10*10^{-7}$ * TDS^2)	r^2=0,99
Mg	= (0,0295 * TDS) + ($8,60*10^{-8}$ * TDS^2)	r^2=0,98
SO_4	= (0,5365 * TDS) + ($4,72*10^{-7}$ * TDS^2)	r^2=1,00

B. Calculations from TDS (TDS < 25,000 mg/l)

Acidity	= (0,0856 * TDS) + ($2,177*10^{-5}$ * TDS^2)	r^2=0,99
Al	= (0,0006 * TDS) + ($1,206*10^{-6}$ * TDS^2)	r^2=0,98
Cond.	= (1,0099 * TDS) - (0,0044 $TDS^{1,5}$)	r^2=0,97
Fe_{tot}	= (0,0204 * TDS) + ($5,988*10^{-6}$ * TDS^2)	r^2=0,99
SO_4	= (0,4357 * TDS)	r^2=0,95

C. Calculations from conductivity (TDS > 25,000 mg/l)

Acidity	= (1,230 * C) + ($5,374*10^{-5}$ * C^2)	r^2=0,98
Al	= (0,042 * C) + ($5,516*10^{-6}$ * C^2)	r^2=0,96
Fe_{tot}	= (0,355 * C) + ($1,047*10^{-5}$ * C^2)	r^2=0,97
Mg	= (0,025 * C) + ($5,895*10^{-6}$ * C^2)	r^2=0,98
SO_4	= (0,885 * C) + ($6,657*10^{-5}$ * C^2)	r^2=0,98

TDS = Total Dissolved Solids, C = Conductivity
r^2=Coefficient of Determination
All values are in mg/l except conductivity which is in mS.

The full use of these relationships was made during 1992 (spring thaw, summer and fall), when about 500 samples were collected from the ditches. Parameters such as conductivity, TDS, pH, E_H and specific gravity were measured on most samples, allowing calculation of individual elements and acidity.

The relationships established for the south dump are unique to that site. However, since the mechanisms responsible for acid production in waste rock dumps are likely to be the same everywhere, similar relationships could be established at other sites for monitoring purposes.

3. Analyses by Energy Dispersive X-Ray Fluorescence (EDXRF)

While the relationships described above were developed for monitoring purposes of the leachate from the ditches, a more precise method of chemical analysis was needed for samples collected in the wells, lysimeters, and other special applications. Again, in developing the method, the objectives were that analyses should be faster and cheaper than conventional chemical analysis and that the method could handle numerous samples. EDXRF was selected as the analytical method for this application. At the time of this report, the development of the method is not yet fully completed but preliminary results presented here show its potential.

In the EDXRF method, an X-ray irradiated sample emits characteristic X-rays from each element present. These X-rays are detected by a Si(Li) detector and are subsequently discriminated by a multichannel analyser. The result is a plot of the incident X-ray energy versus the number of counts (Fig. 4). On this plot, the intensity above background of an element characteristic X-ray line is proportional to its concentration in the sample. Ideally, the relationship is linear. However, this seldom occurs in real systems except over very narrow concentration ranges. Inter-element effects (or absorption or enhancement effects) are responsible for deviation from linearity. When, in a sample, variations in element concentrations are high, correction schemes must be developed to incorporate these inter-element effects.

The interest in using this method to analyse the acid leachate from the South Dump, is that the ratio of one element to the other is almost constant in all samples collected (±dilution). This greatly simplifies the correction of inter-elements effects since they are approximately identical in all samples. One standard typical of the leachate at different dilution levels may thus be used to establish calibration curves.

3.1 Description of the method

In EDXRF, many types of sample preparation are available for liquids. While direct analysis of the liquid sample is possible, lower detection limits are to be expected for light elements due to the absence of vacuum and the interference of the sample cell window, for example a polycarbonate film. Instead of direct liquid analysis, we choose a concentration technique by evaporation on a membrane filter, and subsequent analysis of the filter under high vacuum conditions. For such a method to be valid, several conditions must be met. The most important one is that the volume of liquid used must be precise and reproducible. By using a fixed volume of liquid and subsequently evaporating it, the concentration of the analytes will be proportional to the mass of the residue on the filter. Another condition which must be satisfied is that all the residue on the membrane filter must be exposed to the incident X-rays. These two important conditions are met by using a high precision micropipette which delivers 20ml of the sample with an accuracy of ±1%. Experience has shown that a sample volume of 20ml will produce a residue spot with a maximal diameter of approximately 15mm on a 47mm membrane filter. In the system we are using, the sample surface exposed to the X-ray beam has an oblique form with a maximal width of approximately 20mm, at

the center of the specimen placement. The residue spot must therefore be correctly positioned at the center of the filter.

3.1.1 Choice of the membrane filter

Several types of membrane filter were tested for this application. The "cellulose" type filters are best suited but care must be taken to assess the presence of contaminants, especially sulfur and phosphorus. We used 47mm Gelman cellulose ester (GN-6) filter. Millipore HA filters are also adequate.

A special sample holder was made using a 25mm diameter HDPE cylinder (usually used to analyze liquid or powder samples) and an external o-ring also of HDPE. The filter is placed on the cylinder and the o-ring is placed to tighten it firmly in place (like a drumhead). This sample holder fits exactly, at the suitable height for analysis in the instrument. Furthermore, this way of placing the filter in the sample holder prevents curling or cracking upon drying.

3.1.2 Instrumental conditions

To optimise the response of light elements (Mg, Al and S) and to allow analysis of all major elements in only one sequence, instrumental conditions were:

Instrument	*Link XR200 Energy dispersive XRF spectrometer*
X-ray tube	*Rh*
Accelerating voltage	*10 kV*
Current	*200 mA*
Tube filter	*none*
Counting time	*300 sec*
Atmosphere	*vacuum*
System calibration element	*Cu (FLS standard)*
Elements analysed	*Mg, Al, S, Ca, Fe*
Energy range	*1 to 10 keV*

If other heavier elements of interest were to be analysed, such as Cu, Zn, As, etc., conditions could be optimized for this purpose (higher accelerating voltage and use of a filter to cut-off radiation from lighter elements).

3.1.3 Preparation of calibration curves

As mentioned above, a unique standard, with a composition (ratio of elements) similar to the leachate was prepared using iron and magnesium sulfates for Fe, Mg and SO_4, and calcium and aluminium nitrate for Ca and Al. Manganese sulfate was also added but not analyzed due to its

low concentration and the instrumental conditions. Reagents were added to 10% nitric acid (to prevent precipitation) to make the stock solution. The stock solution was then diluted with 10% nitric acid to produce 7 standard solutions and a blank.

Table 3. Reagents used in the preparation of the standard solution

Reagent	Weight (g)	Element	Concentration in the std solution (mg/l)*
$FeSO_4 \cdot 7H_2O$	17.42385	Fe	3 500
$MgSO_4 \cdot 7H_2O$	12.67224	Mg	1 250
$MnSO_4 \cdot H_2O$	0.30763	Mn	100
$Ca(NO_3)_2 \cdot 4H_2O$	5.89221	Ca	1 000
$Al(NO_3)_3 \cdot 9H_2O$	13.90389	Al	1 000
		SO_4**	11 135

* Completed to 1000 ml with 10% HNO_3

** S analysed as equivalent SO_4

Table 4. Calibration standards

Standard	Fe (mg/l)	Mg (mg/l)	Mn (mg/l)	Ca (mg/l)	Al (mg/l)	SO_4 (mg/l)	Dilution* SS:Solv
ST-1	3 500	1 250	100	1 000	1 000	11 135	1:0
ST-2	2 917	1 042	83	833	833	9 279	1:0.2
ST-3	2 333	833	67	667	667	7 423	1:0.5
ST-4	1 750	625	50	500	500	5 568	1:1
ST-5	1 167	417	33	333	333	3 712	1:2
ST-6	583	208	17	166	166	1 856	1:5
ST-7	167	60	5	48	48	530	1:20
Blank	0	0	0	0	0	0	0:1
S-40**	88	31	3	25	25	278	1:39
S-100***	35	13	1	10	10	111	1:99

*Dilution: Ratio of stock solution (SS) to solvent (Solv) HNO_3 10%.

** Standard S-40 used for the determination of the method detection limit (MDL) of Mg, Al, Ca and Fe.

*** Standard S-100 used for the determination of the MDL of SO_4.

Three separate samples of each standard solution were analyzed for calibration. Results are presented in Figure 5 and Table 5.

Table 5. Recorded intensity for each standard*

Standard	Fe	Mg	Ca	Al	SO_4
ST-1	107.50	7.03	73.98	19.63	634.88
ST-2	91.77	6.07	64.69	16.87	552.98
ST-3	74.67	5.02	52.01	14.94	477.67
ST-4	57.85	4.37	39.79	12.53	385.78
ST-5	39.04	2.55	27.49	8.34	244.04
ST-6	19.80	1.39	14.30	5.04	131.37
ST-7	9.02	0.57	6.24	2.77	51.62
Blank	3.72	0.04	2.35	1.41	11.35

* Average value of three measurements. All values are in counts per seconds (cps).

3.1.4 Determination of the Method Detection Limit (MDL)

The method detection limit (MDL) is defined as the minimum concentration of a substance which can be measured and reported with 99% confidence that the value is above zero. To determine the MDL, seven duplicates of low level standards (see above S-40 and S-100) were analyzed and the standard deviation (s) for each element was calculated. From the table of one-sided *t* distribution (value for 6 degree of freedom, 99% level), 3.143 times (s) is the MDL . Standard S-40 was used to evaluate the MDL for Fe, Mg, Ca and Al, and standard S-100 for SO_4. Results are presented in Table 6.

Table 6. Method detection limits (MDL)

Standard	Fe	Mg	Ca	Al	Standard	SO_4
	I(cps)C(mg/l)	I(cps)C(mg/l)	I(cps)C(mg/l)	I(cps)C(mg/l)		I(cps)C(mg/l)
S-40-1	5.97 71	0.23 27	3.92 23	2.13 30	S-100-1	20.72 179
S-40-2	5.90 69	0.25 30	2.94 10	2.32 38	S-100-2	18.62 151
S-40-3	6.06 74	0.37 47	5.00 36	1.94 22	S-100-3	18.06 143
S-40-4	5.68 61	0.18 20	4.57 31	2.10 29	S-100-4	19.82 167
S-40-5	6.63 93	0.14 14	4.81 34	1.89 20	S-100-5	19.10 157
S-40-6	6.66 94	0.21 24	4.61 31	2.06 27	S-100-6	19.99 169
S-40-7	7.14 110	0.32 40	4.69 32	2.10 29	S-100-7	19.57 163
Mean St.Dev.(s)	81.7 17.5	29.0 11.3	28.3 9.0	27.9 5.9		161.3 12.1
MDL	55.0	35.5	32.2	18.5		38.1

MDL = 3.14*s (6 deg. of freedom, 99% level). Values of MDL are in mg/l.

3.2 Routine analyses

The standards calibration is incorporated in a method which is stored in the instrument computer. Each time a sample is analyzed, the instrument is automatically set to operating conditions and instructions to proceed are given to the user, according to the method.

Since SO_4 is the most abundant species in the leachate, it serves as a base for the preparation of the sample, i.e. dilution. Dilution of the sample is done with HNO_3 10% to provide a matrix identical to the standards. For a highly contaminated sample, the goal is to dilute just enough so that its sulfate content is at the center of the calibration curve, around 6000 mg/l. For lower concentration samples, a 10% dilution is performed mainly to prevent unwanted precipitation. The sulfate concentration of the sample is estimated by conductivity or TDS as described in section 2 above. After the analysis is performed, the results obtained are then multiplied by the dilution factor to complete the report.

The time for a complete analysis is less than 10 minutes (including making and breaking of vacuum). This time could be reduced to 7 minutes per sample by the use of an automated multiple sample holder (optional attachment).

3.3 Example of results

Samples collected in the wells during the spring of 1993 were analyzed using the two rapid methods and conventional chemical analysis. Results are shown in Table 7. Good agreement is observed between the two rapid methods and chemical analysis.

During the summer of 1992, sand and gravel samples were collected in trenches made on the south dump. Pore solution from these samples was extracted using a high pressure press. For many samples, only 1 to 2 ml of solution was extracted. Since only 20 ml of solution is necessary for EDXRF analysis, 1 ml is more than enough. Results of these analyses are presented in Table 8.

Table 7. Example 1. Analysis of piezometer leachate samples by conventional methods, EDXRF and calculated values.

	SO_4 (mg/l)			Fe (mg/l)		
Well	Chemical	Calculated	EDXRF	Chemical	Calculated	EDXRF
1R	27 881	28 204	27 955	4 282	7 680	4 211
1S	37 755	33 937	36 078	5 232	9 102	5 322
2R	87 152	82 553	78 671	13 069	19 632	12 531
2S	73 093	71 664	69 372	14 897	17 487	13 588
3R	108 989	103 558	104 194	17 079	23 474	16 351
3S	116 470	107 690	97 723	18 160	24 187	16 332
4R	60 844	53 135	56 960	10 666	13 566	10 347
4S	3 710	3 019	3 746	549	429	534
6R	125 377	115 720	111 566	25 730	25 535	24 987
101R	435	283	428	<1	16	<61
102R	1 974	1 420	1 718	1	130	<61
103R	22 972	23 141	24 568	6 040	6 388	6 380
104R	52 680	45 996	52 430	8 110	11 957	8 364
105S	122	96	127	<1	5	<61
105R	20	44	<42	<1	2	<61
106S	2448	1 895	2 516	24	202	<61
107R	47 128	49 927	49 488	9 726	12 850	9 870
W3	20783	20 491	21 178	3 909	5 698	4 034

Table 7. Continued

	Al (mg/l)			Mg (mg/l)		
Well	Chemical	Calculated	EDXRF	Chemical	Calculated	EDXRF
1R	1 977	1 852	1 819	1 848	1 703	1 479
1S	2 678	2 248	2 441	2 904	2 083	2 456
2R	6 791	5 830	5 333	5 504	5 671	4 647
2S	4 864	4 997	3 609	4 621	4 816	3 226
3R	8 386	7 479	7 324	7 524	7 392	5 507
3S	8 717	7 810	5 989	8 080	7 741	4 392
4R	3 225	3 619	2 635	5 302	3 426	4 441
4S	8	62	<21	460	na	504
6R	7 165	8 458	5 742	8 938	8 428	7 222
101R	<1	1	<21	14	na	<40
102R	<1	15	<21	149	na	153
103R	nd	1 507	1 513	636	1 376	600
104R	4 800	3 102	4 281	2 878	2 914	2 180
105S	<1	<1	nd	2	na	<40
105R	<1	<1	<21	1	na	nd
106S	<1	25	<21	333	na	212
107R	3 364	3 385	2 952	2 828	3 194	2 496
W3	1 345	1 329	1 314	1 000	1 209	983

na: not available nd: not detected

Table 7. Continued

	Ca (mg/l)	
Well Sample	Chemical	EDXRF
1R	545	558
1S	515	477
2R	586	658
2S	656	538
3R	636	903
3S	677	579
4R	656	685
4S	384	393
6R	783	831
101R	131	155
102R	621	704
103R	475	475
104R	545	549
105S	37	43
105R	6	12
106S	373	409
107R	495	653
W3	475	501

Table 8. Example 2. EDXRF analysis of pressure extracted leachate samples.

Trench #	Depth (m)	Fe (mg/l)	SO4 (mg/l)	Al (mg/l)	Mg (mg/l)	Ca (mg/l)
T92-1	0,0	na	na	na	na	na
	0,5	< 110	2 412	< 37	< 71	840
	1,0	< 110	3 402	< 37	< 71	1 171
	1,5	< 110	2 152	< 37	< 71	714
	2,0	< 110	1 809	< 37	< 71	764
	2,5	< 110	2 261	< 37	< 71	724
	3,0	< 110	1 904	< 37	nd	684
	3,5	< 110	2 230	< 37	< 71	744
	4,0	< 110	1 922	< 37	< 71	626
T-92-2	0,0	nd	nd	nd	nd	nd
	0,5	< 110	2 130	< 37	92	554
	1,0	< 55	1 997	< 19	72	645
	1,5	7 425	28 506	470	725	780
	2,0	6 406	21 219	360	270	515
	2,5	19 070	80 737	3 576	3 060	552
	3,0	36 982	145 280	5 172	4 428	780
	3,5	6 018	44 625	3 360	1 920	696
	4,0	19 358	131 140	8 196	6 576	1 164

4. Conclusion

Two new methods of monitoring the chemical composition of acid mine drainage are presented. The main objective in developing these new methods is to supply alternative analytical procedures to conventional chemical analysis. These procedures are faster, more cost efficient, and applicable in field conditions (correlation method). Since the acid drainage at the Doyon site has a "signature" of its own, a high degree of correlation is observed between the concentration of all major elements. Calibration curves correlating simple parameters (TDS and conductivity) and values of acidity, sulfate, iron, and other metals were established. For monitoring purposes, large numbers of samples are usually taken. By measuring TDS and conductivity, all other major constituents can be extrapolated from the calibration curves. This method of evaluating the drainage is rapid, simple, and field applicable.

A second analytical method, based on EDXRF spectroscopy is also proposed. This method is intended to provide more accurate results than the correlation method, particularly for lower concentration samples, like those from the wells around the South Dump. The sample preparation and the analytical method proposed is especially adapted for the analysis of atomic elements numbers 12 to 26 (Mg to Fe). Modification of the method can easily be made for the analysis of heavier elements. Once the calibration of the method is done, a high analytical output can be expected, with approximately 40 samples per day (analysis of Al, Mg, S, Ca and Fe). Another important advantage of this analytical technique is the low volume of sample necessary (20 ml). Refinements of the method are still necessary, nevertheless it is already proven to be valuable.

Figure 1. Relationships between TDS and major elements (TDS>25 000 mg/l)

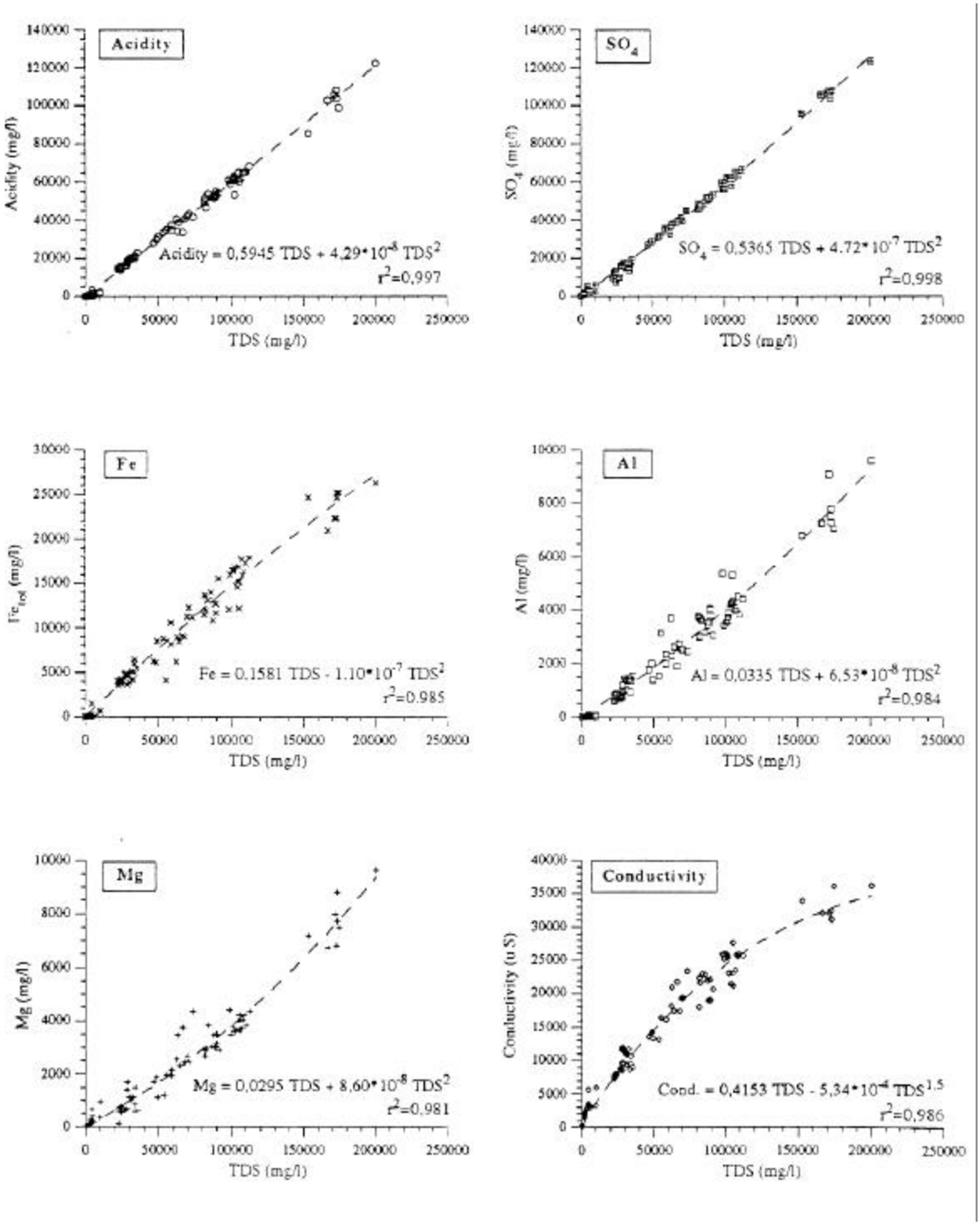


Figure 2. Relationships between TDS and major elements (TDS<25 000 mg/l)

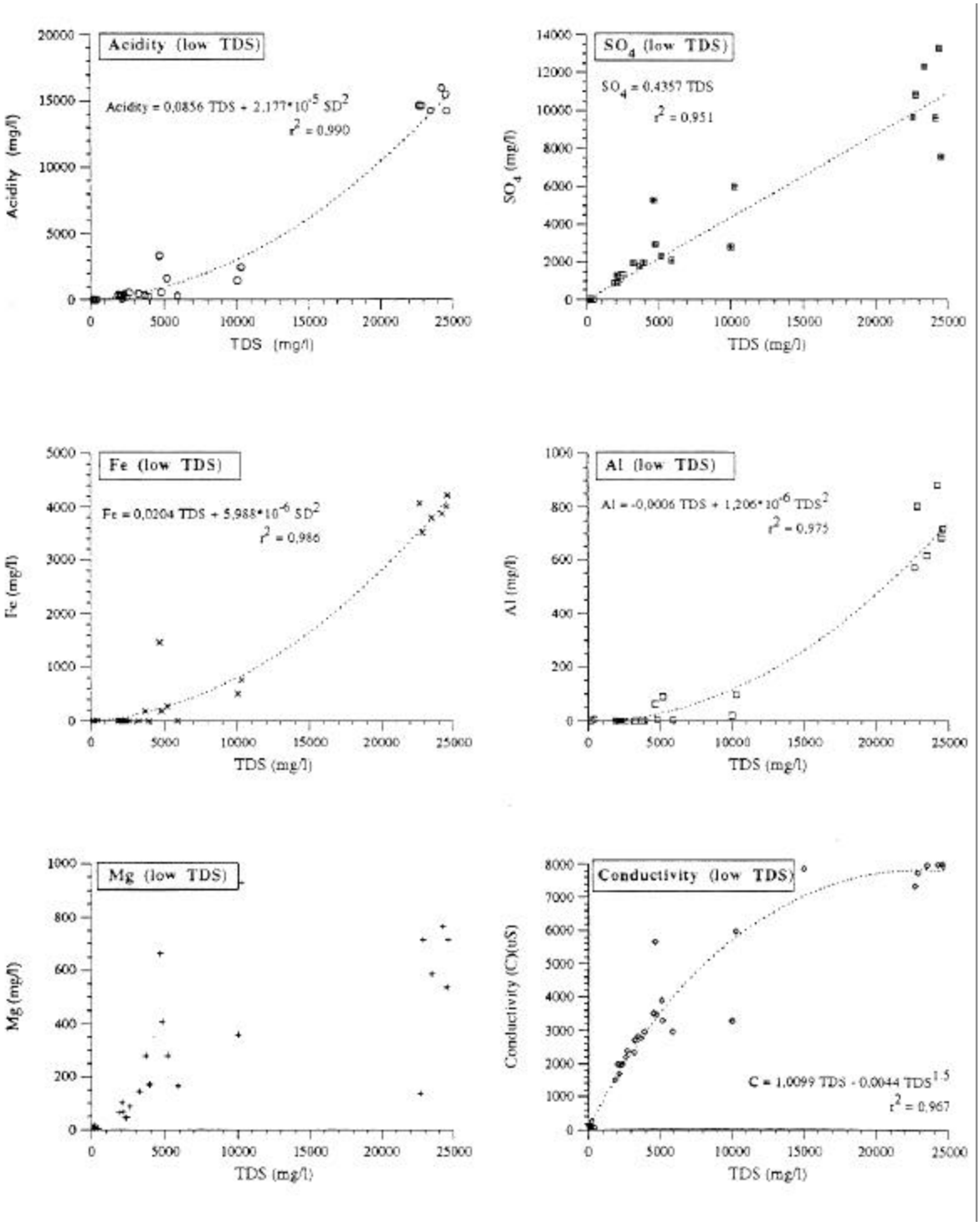


Figure 3. Relationships between conductivity and major elements

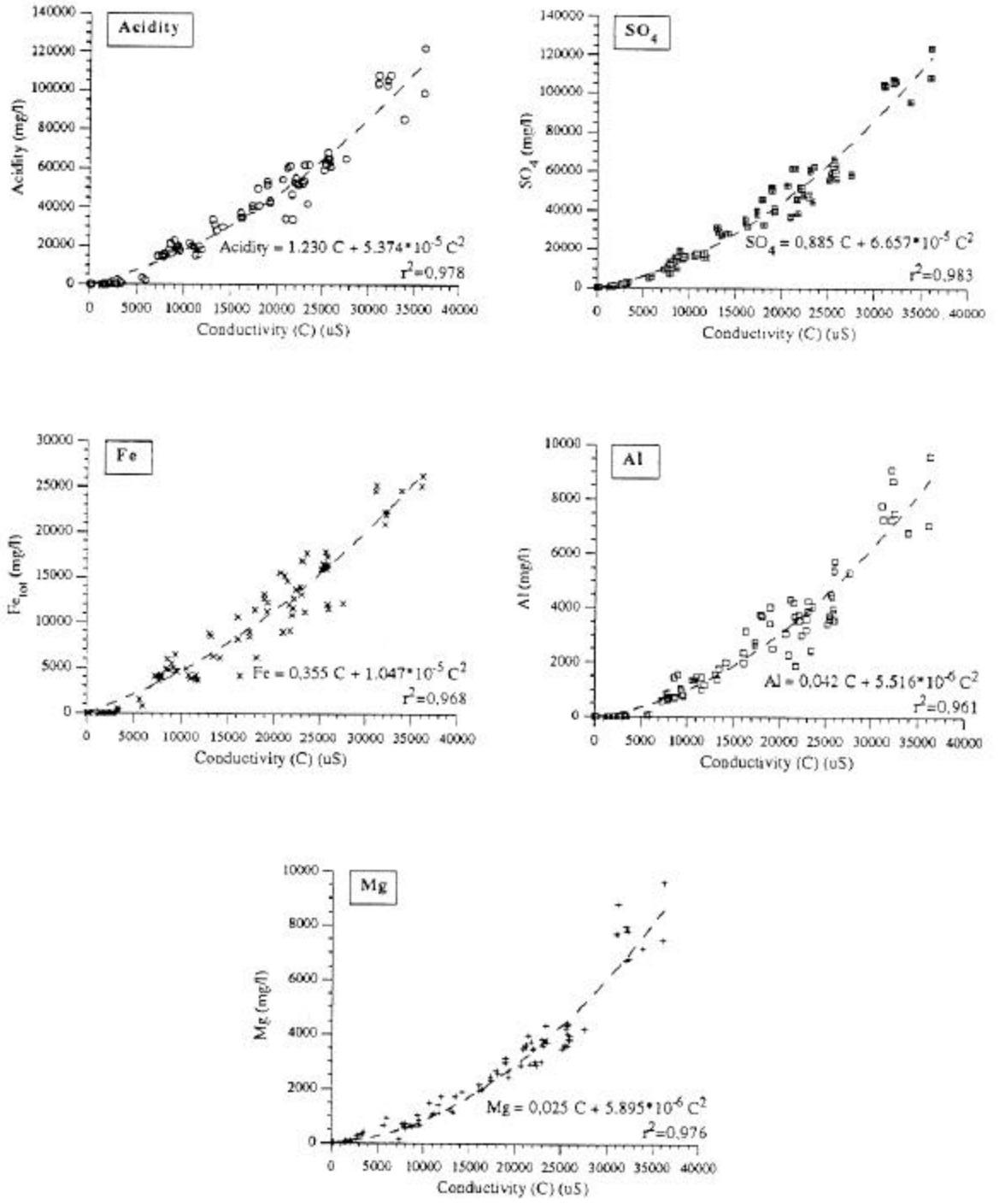


Figure 3. Example of an EDXRF spectrum

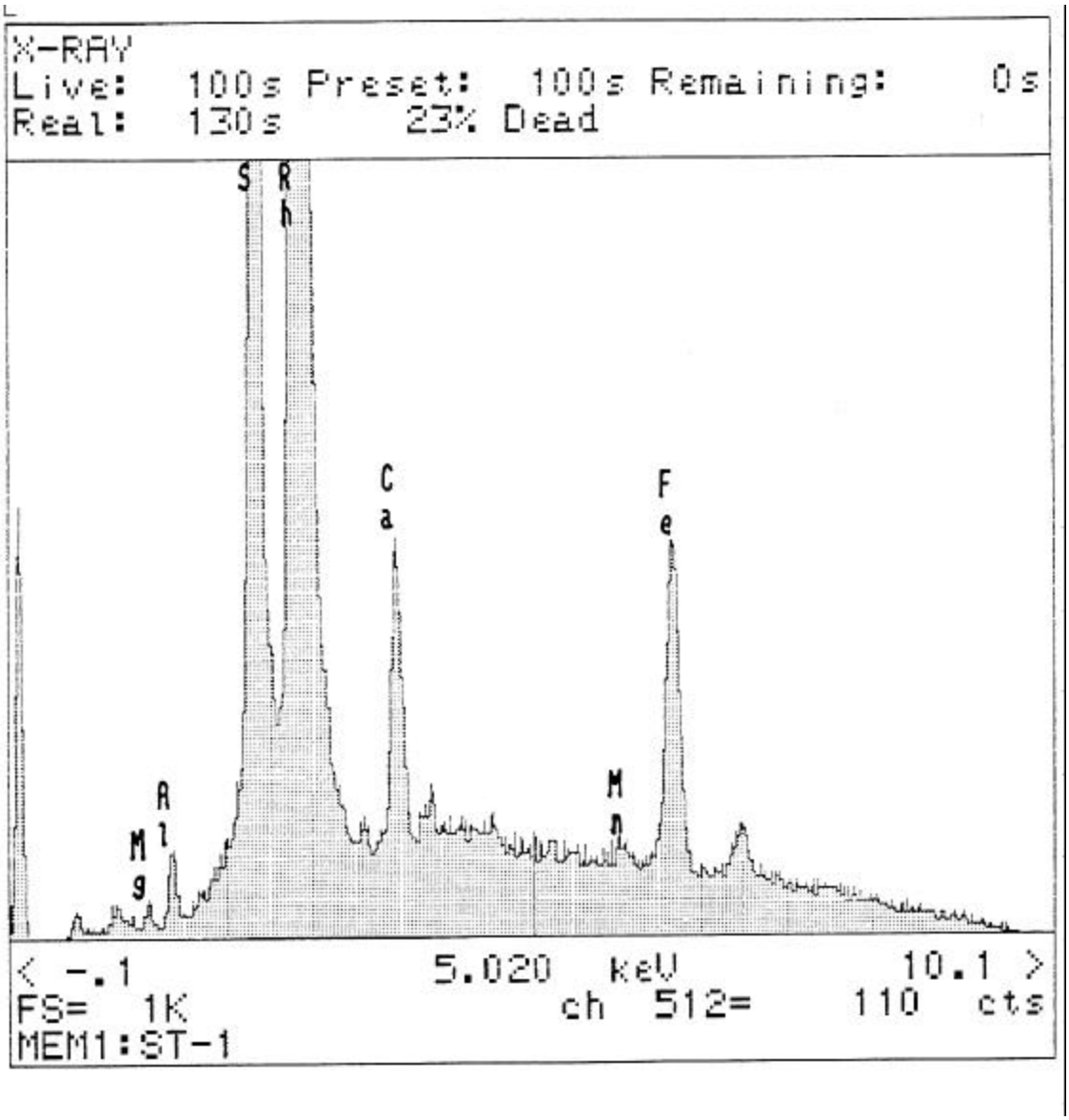
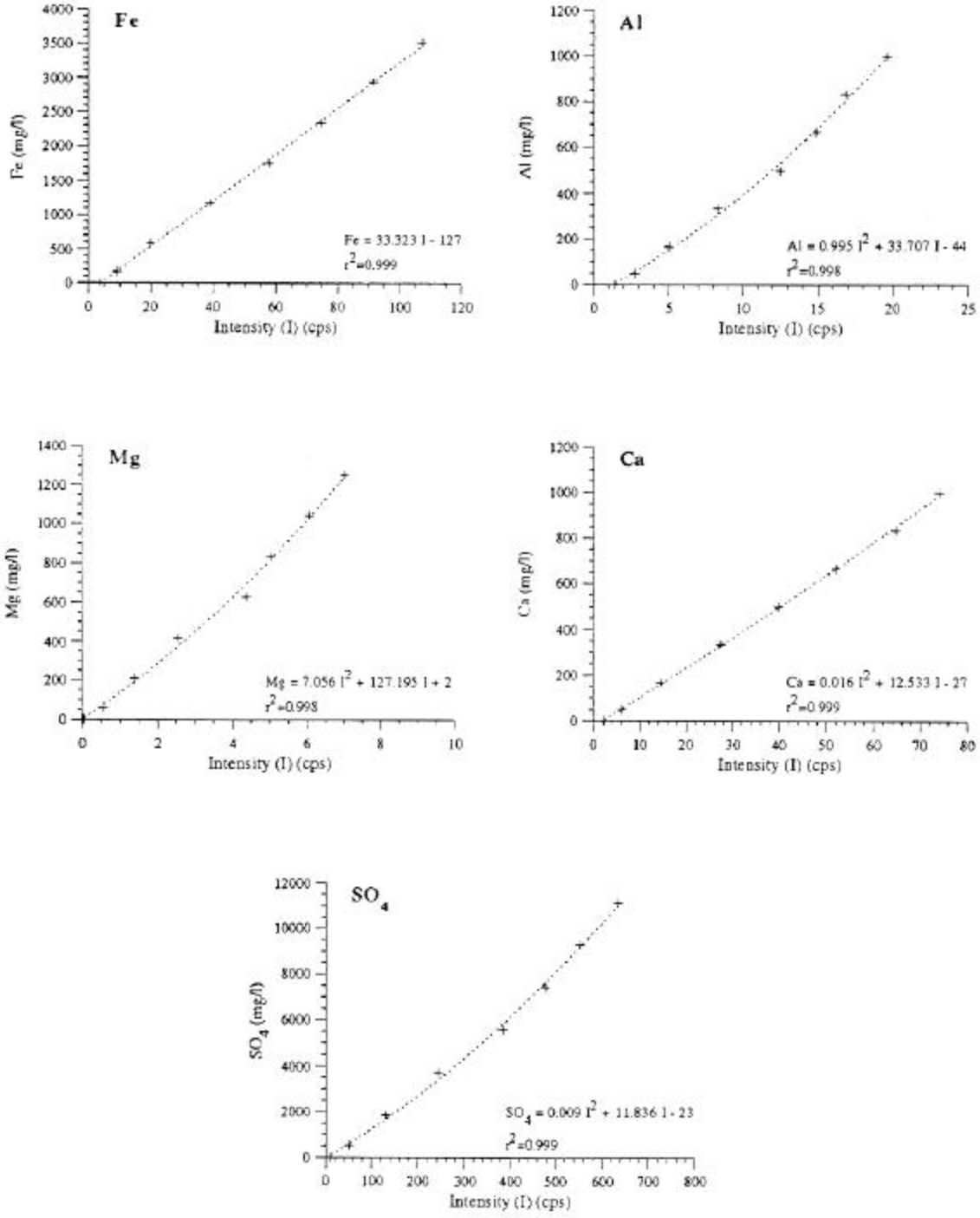


Figure 5. EDXRF calibration curves



Appendix A-1: Chemical data

Sample/Date *	Acidity (mg/l)	SO4 (mg/l)	Fet (mg/l)	Fe++ (mg/l)	Fe+++ (mg/l)	Al (mg/l)	Ca (mg/l)	Mg (mg/l)	Tot.Diss.Sol. (mg/l)	EH (mV)	Spec. Grav. (g/cc)	Conduct. (uS)	pH	log(Fe2/Fe3)
510 11/3/91	61,859	61,556	16,877	6,110	10,767	4,264	643	3,686	105,340	434	1.0860	23,100	2.13	-0.246
510 18/3/91	53,365	60,696	16,816	5,706	11,110	3,886	616	3,585	102,565	435	1.0840	23,100	2.14	-0.289
510 25/3/91	61,957	62,939	17,715	6,413	11,302	4,074	618	3,737	107,120	435	1.0870	23,600	2.10	-0.246
510 2/4/91	54,396	53,462	15,524	4,646	10,878	3,062	567	2,878	91,610	441	1.0740	20,700	2.02	-0.369
510 9/4/91	34,923	34,097	10,582	2,346	8,236	1,979	386	1,938	58,700	451	1.0450	16,150	2.29	-0.545
510 15/4/91	43,360	39,730	12,240	4,182	8,058	2,507	419	2,448	70,995	429	1.0560	19,330	2.33	-0.285
510 22/4/91	42,183	41,347	11,233	4,284	6,949	2,507	379	2,652	69,605	435	1.0560	19,320	2.35	-0.210
510 29/4/91	51,649	48,627	13,693	4,539	9,154	2,996	444	2,881	82,255	435	1.0640	22,400	2.26	-0.305
510 7/5/91	52,238	49,051	13,974	3,009	10,965	3,195	519	3,009	86,455	448		22,900	2.23	-0.560
510 13/5/91	62,784	58,886	16,473	3,927	12,546	3,731	590	3,621	102,030	445		25,400	2.20	-0.504
510 20/5/91	61,803	62,918	16,537	3,672	12,865	3,609	598	3,595	102,125	444		25,500	2.21	-0.545
510 27/5/91	63,274	59,997	16,294	4,182	12,112	3,550	584	3,595	101,940	441		25,800	2.23	-0.462
510 3/6/91	59,105	56,170	15,988	4,182	11,806	3,430	572	3,468	99,335	444		25,200	2.23	-0.451
510 10/6/91	65,236	63,577	17,302	3,723	13,579	3,852	617	3,825	110,185	451		25,900	2.25	-0.562
510 16/6/91	61,312	56,540	16,473	4,794	11,679	3,550	584	3,799	100,960	451		26,000	2.24	-0.387
511 11/3/91	61,269	62,173	14,605	1,767	12,838	4,222	532	3,964	104,250	475	1.0870	21,500	2.12	-0.861
511 18/3/91	53,365	52,125	12,665	909	11,756	4,032	489	3,131	89,790	485	1.0700	19,000	2.12	-1.112
511 25/3/91	60,484	62,190	15,211	1,666	13,545	4,328	506	3,611	105,600	474	1.0850	21,200	2.09	-0.910
511 2/4/91	51,549	50,623	13,130	1,313	11,817	3,438	523	2,979	88,565	492	1.0680	19,000	2.01	-0.954
511 9/4/91	19,620	15,061	5,087	21	5,066	1,030	266	1,045	31,385	567	1.0220	9,350	2.35	-2.382
511 15/4/91	14,617	10,851	3,519	52	3,467	802	208	714	22,870	521		7,720	2.49	-1.824
511 22/4/91	15,941	9,629	3,876	135	3,741	882	186	765	24,250	501	1.0180	7,970	2.50	-1.443
511 29/4/91	21,484	16,731	4,883	304	4,579	1,346	215	1,479	34,180	483	1.0280	10,650	2.41	-1.178
511 7/5/91	28,057	27,035	6,222	48	6,174	1,768	334	1,709	46,700	600		13,540	2.28	-2.109
511 13/5/91	37,278	35,471	8,109	82	8,027	2,346	391	2,142	58,825	570		16,160	2.25	-1.990
511 20/5/91	40,711	39,874	8,938	156	8,782	2,736	417	2,448	68,145	605		17,400	2.23	-1.747
511 27/5/91	38,847	38,105	8,428	158	8,270	2,624	412	2,320	64,445	593		17,420	2.25	-1.718
511 3/6/91	29,920	28,270	6,069	95	5,974	1,994	324	1,887	48,755	605		14,240	2.32	-1.798
511 10/6/91	55,181	51,232	11,628	360	11,268	3,790	454	3,493	89,685	572		22,100	2.30	-1.495
511 16/6/91	52,729	52,301	10,837	476	10,361	3,550	433	3,442	87,785	526		22,000	2.29	-1.338

Sample/Date *	Acidity (mg/l)	SO4 (mg/l)	Fet (mg/l)	Fe++ (mg/l)	Fe+++ (mg/l)	Al (mg/l)	Ca (mg/l)	Mg (mg/l)	Tot.Diss.Sol. (mg/l)	EH (mV)	Spec. Grav. (g/cc)	Conduct. (uS)	pH	log(Fe2/Fe3)
512 9/4/91	19,963	15,917	6,413	99	6,314	949	361	841	33,960	520		9,490	2.31	-1.805
512 15/4/91	14,617	9,654	4,067	110	3,957	571	257	135	22,685	514		7,330	2.39	-1.556
512 22/4/91	14,224	7,564	4,220	149	4,070	716	263	714	24,615	506		7,920	2.39	-1.436
512 29/4/91	16,284	9,938	4,768	162	4,606	682	247	637	27,035	511		8,740	2.22	-1.454
512 7/5/91	17,756	15,719	4,845	32	4,813	733	366	688	28,265	610		8,520	2.20	-2.177
512 13/5/91	14,224	12,345	3,799	28	3,771	615	409	586	23,500	588		7,950	2.24	-2.125
512 20/5/91	17,658	16,336	4,539	38	4,501	766	412	663	28,760	588		9,666	2.20	-2.073
512 27/5/91	31,147	28,928	8,479	55	8,424	1,379	456	1,122	49,470	595		13,310	2.09	-2.185
512 3/6/91	18,639	16,336	4,692	39	4,653	813	306	688	28,585	607		9,530	2.19	-2.077
512 10/6/91	33,746	31,356	8,759	115	8,644	1,546	479	1,198	53,740	590		13,120	2.15	-1.867
512 16/6/91	15,451	13,291	4,003	128	3,875	681	349	535	24,535	606		7,990	2.19	-1.481
1R 8/4/91	15,794	16,052	3,672	2,550	1,122	1,003	510	1,402	28,500	256		11,620	3.84	0.356
1R 24/4/91	18,148	15,865	3,621	2,626	995	1,174	511	1,708	28,770	261		11,930	3.77	0.421
1R 12/6/91	15,207											11,250		
1S 8/4/91	3,358	5,289	1,466	1,465	1	63	319	663	4,677	262		5,640	3.84	
1S 24/4/91	1,439	2,819	500	445	55	19	288	357	10,060	205		3,270	4.69	0.908
1S 12/6/91	1,623	2,341	266	141	125	89	308	280	5,205	320		3,280	3.00	0.052
2R 26/3/91	60,975	61,287	11,585	8,888	2,697	5,734	688	3,964		327		26,000	3.25	0.518
2R 24/4/91	61,067	59,840	12,049	9,843	2,206	5,393	498	4,386	98,655	328		25,900	3.14	0.649
2R 12/6/91	64,991	58,927	12,176	9,588	2,588	5,326	584	4,216	105,540	384		27,600	2.66	0.569
2S 26/3/91	65,195	63,511	16,301	8,282	8,019	4,522	647	4,217	109,015	409		25,600	2.20	0.014
2S 24/4/91	68,425	66,745	17,875	7,905	9,970	4,413	538	4,335	112,595	417		25,700	2.15	-0.101
2S 12/6/91	64,844	65,387	15,899	8,109	7,790	3,974	609	4,012	107,780	417		25,800	2.02	0.017
3R 27/3/91	105,650	107,875	22,311	12,170	10,141	9,110	636	7,979	171,580	398		32,100	2.32	0.079
3R 24/4/91	103,840	105,311	24,582	12,138	12,444	7,795	510	7,714	173,180	407		31,100	2.25	-0.011
3R 12/6/91	108,010	106,780	22,344	10,557	11,787	7,524	603	6,800	172,860	386		32,400	1.92	-0.048
3S 27/3/91	105,160	106,928	21,927	11,867	10,060	8,696	645	7,827		399		32,200	2.30	0.072
3S 24/4/91	108,010	104,046	25,194	11,271	13,923	7,287	579	8,797	173,160	417		31,200	2.16	-0.092
3S 12/6/91	102,760	106,043	20,942	9,996	10,946	7,261	614	6,732	166,895	392		32,100	1.95	-0.039
4R 26/3/91	34,120	37,399	8,928	8,121	807	2,277	636	3,459	62,905	331		21,000	3.78	1.003
4R 24/4/91	41,839	45,076	11,194	9,129	2,065	2,445	637	4,335	73,620	277		23,400	3.36	0.646

Sample/Date *	Acidity (mg/l)	SO4 (mg/l)	Fet (mg/l)	Fe++ (mg/l)	Fe+++ (mg/l)	Al (mg/l)	Ca (mg/l)	Mg (mg/l)	Tot.Diss.Sol. (mg/l)	EH (mV)	Spec. Grav. (g/cc)	Conduct. (uS)	pH	log(Fe2/Fe3)
4R 12/6/91	33,844	38,928	9,103	7,497	1,606	1,887	581	3,740	66,525	292		21,800	2.78	0.669
4S 26/3/91	2,446	5,999	757	434	323	97	512	929	10,315	290		5,970	4.11	0.128
4S 24/4/91	569	2,934	175	168	7	6	402	408	4,807	170		3,470	4.95	1.380
4S 12/6/91	327	1,751	181	108	73	1	343	280	3,710			2,750	5.68	0.170
6R 26/3/91	85,424	96,147	24,631	20,806	3,825	6,801	688	7,171	153,290	336		33,900	3.30	0.736
6R 23/4/91	122,130	123,894	26,265	19,788	6,477	9,610	528	9,626	200,530	375	1.1310	36,200	2.37	0.485
6R 13/6/91	98,835	108,600	25,181	22,848	2,333	7,067	637	7,480	174,740	358		36,100	2.75	0.991
101R 27/3/91	70	604	<1	<1	<1	1	413	39				1,460	6.70	-0.114
101R 24/4/91	191	1,344	1	<1	1	1	435	45	2,397	317		1,980	5.93	-0.845
102R 24/4/91	387	1,111	1	<1	1	1	446	47	2,287	296		1,960	6.75	-0.699
102R 12/6/91	265	1,988	2	<1	1	1	671	171	3,940	442		2,940	6.33	
103R 24/4/91	21,190	13,711	5,941	510	5,431	1,430	301	586	33,640	470		8,660	2.53	-1.027
103R 12/6/91	22,906	19,176	5,444	673	4,771	1,546	403	612	35,500	463		9,050	2.16	-0.851
104R 27/3/91	49,683	45,862	11,413	2,171	9,242	3,772	3,772	2,676	81,700	446		18,000	2.32	-0.629
104R 25/4/91	40,711	33,015	6,158	2,295	3,863	3,704	408	2,550	62,345	427		18,140	2.61	-0.226
104R 13/6/91	34,825	31,891	4,105	1,683	2,422	3,136	442	1,963	55,275	407		16,400	2.23	-0.158
105R 28/3/91	11	1	<1	<1	<1	1	18	4	207	380		125	5.82	-0.361
105R 25/4/91	10	50	2	<1	2	1	50	10	215	383		124	6.24	-1.176
105R 13/6/91	9	1	7	1	6	8	9	4	425	442		75	6.00	-0.778
105S 25/4/91	14	63	<1	<1	<1	1	75	18	225	337		264	6.83	-0.699
106R 28/3/91	540	1,317	<1	<1	<1	1	618	87	2,595	335		2,180	5.97	-0.079
106R 25/4/91	444	1,958	1	<1	1	1	1,492	144	3,252	340		2,690	5.94	-1.398
106R 13/6/91	299	2,100	7	1	7	3	713	166	5,925	275		2,940	5.72	0.062
106S 28/3/91	344	878	<1	<1	<1	1	472	65	1,895	290		1,510	6.03	-0.255
106S 25/4/91	304	1,278	<1	<1	<1	1	3,226	102	2,072	333		1,980	6.16	-0.699
106S 13/6/91	93	864	1	<1	1	1	407	69	2,165	230		1,680	6.25	-1.278
107R 28/3/91	46,738	46,043	11,979	7,070	4,909	3,700	631	2,929	82,785	394		21,700	2.44	0.158
107R 25/4/91	53,955	47,623	13,107	8,313	4,794	3,618	534	3,825	84,050	394		23,000	2.53	0.239
107R 12/6/91	51,993	51,931	12,661	6,375	6,286	3,550	621	3,009	89,320	417		22,200	2.23	0.006
W3S 8/4/91	19,620	17,610	3,825	1,810	2,015	1,430	424	1,122	30,315	423		11,100	2.49	-0.046
W3S 25/4/91	20,110	17,552	4,169	1,938	2,231	1,346	413	1,020	31,445	421		10,900	2.61	-0.061
W3S 12/6/91	20,110	18,209	4,156	1,938	2,218	1,443	482	1,122	32,930	422		11,700	2.30	-0.058

APPENDIX B

Chemical data from monitoring wells

BH-91-01rock		4/8/91	4/24/91	6/12/91	8/30/91	30/10/91	17/06/92	8/15/92
pH		3.84	3.77	3.13	3.77	3.38	3.77	3.48
EH	mV	256	261	279		294	257	284
Conduct.	µS	14049	14423	13601	16000	15342	17373	16926
Densité/SG	g/cc	-	-	-		1.0288	1.0350	1.0370
SD/TDS	mg/l	28500	28770	45408	57711	30875	39300	44380
Acidité/Acidity	mg/l CaCO3	15794	18148	15205	13500	18396	23430	26468
Al	mg/l	1003	1174	1656	1400	1097	1417	1615
Ca	mg/l	5100	5113	-	560	-	-	-
Cu	mg/l	1.5	1.6	-	-	-	-	-
Fe tot	mg/l	3672	3621	6952	3200	4776	6043	6800
Fe ++	mg/l	2550	2626	6783	2500	4597	5967	6609
Fe +++	mg/l	1122	995	169	700	179	77	191
K	mg/l	15.8	15	-	21	-	-	-
Mg	mg/l	1402	1708	1517	1400	993	1292	1479
Mn	mg/l	347	342	-	380	-	-	-
Na	mg/l	59	78	-	38	-	-	-
Ni	mg/l	9	9	-	-	-	-	-
Pb	mg/l	0.65	0.65	-	-	-	-	-
Si	mg/l	19	20	-	-	-	-	-
SO4 =	mg/l	16052	15865	25334	20000	17014	21813	24740
Zn	mg/l	13	13	-	-	-	-	-

BH-91-01Soil		4/8/91	4/24/91	6/12/91	8/30/91	10/30/91	17/6/92	8/15/92
pH		3.84	4.69	3	3.82	2.78	3.42	3.44
EH	mV	262	205	320		385	321	273
Conduct.	µS	6819	3953	3966	10000	9491	13722	18621
Densité/SG	g/cc		-	-	-	1.0143	1.0260	1.0400
SD/TDS	mg/l	4677	10060	5205	1176	14975	27700	48040
Acidité/Acidity	mg/l CaCO3	3358	1439	1623	6000	8912	16501	28659
Al	mg/l	63	19	89	600	516	978	1760
Ca	mg/l	319	288	308	430	-	-	-
Cu	mg/l	1.4	0.3	-	-	-	-	-
Fe tot	mg/l	1466	500	266	3100	2343	4295	7341
Fe ++	mg/l	1466	445	141	1175	1470	3949	7192
Fe +++	mg/l	<0,1	55	125	1925	873	346	150
K	mg/l	18.6	20.8	15.68	21	-	-	-
Mg	mg/l	663	357	280	820	461	883	1616
Mn	mg/l	66	25	21	59	-	-	-
Na	mg/l	60	22	20	17	-	-	-
Ni	mg/l	1	1	-	-	-	-	-
Pb	mg/l	0.33	0.27	-	-	-	-	-
Si	mg/l	12	12	-	-	-	-	-
SO4 =	mg/l	5289	2819	2341	8000	8140	15223	26863
Zn	mg/l	2	1	-	-	-	-	-

BH-91-02 Rock		3/26/91	4/24/91	6/12/91	8/30/91	10/30/91	6/17/92
pH		3.25	3.14	2.66	2.88	2.73	2.93
EH	mV	327	328	384	-	339	344
Conduct.	µS	31434	31313	33368	33000	33973	32885
Densité/SG	g/cc	-	-	-	-	1.0929	1.1100
SD/TDS	mg/l	-	98655	105540	1169	106910	107570
Acidité/Acidity	mg/l CaCO3	60975	61067	64991	52500	64048	64447
Al	mg/l	5734	5393	5326	5300	4328	4359
Ca	mg/l	688	498	584	580	-	-
Cd	mg/l	1.14	-	-	-	-	-
Cu	mg/l	-	80	-	-	-	-
Fe tot	mg/l	11585	12049	12176	11800	15645	15734
Fe ++	mg/l	8888	9843	9588	8300	13605	13400
Fe +++	mg/l	2697	2206	2588	3500	2040	2334
K	mg/l	6.31	4.3	2.1	13	-	-
Mg	mg/l	3964	4386	4216	4100	4137	4168
Mn	mg/l	409	370	365	340	-	-
Na	mg/l	164.6	20	12	8.2	-	-
Ni	mg/l	30.2	31	-	-	-	-
Pb	mg/l	1.3	1.27	-	-	-	-
Si	mg/l	-	57	-	-	-	-
SO4 =	mg/l	61287	59840	58927	70000	62752	63173
Zn	mg/l	42.4	31	-	-	-	-

BH-91-02 Soil		3/26/91	4/24/91	6/12/91	8/30/91	10/30/91	6/17/92
pH		2.2	2.15	2.02	2.46	2.31	2.37
EH	mV	409	417	417	-	392	401
Conduct.	µS	30950	31071	31192	32000	31071	33973
Densité/SG	g/cc	-	-	-	-	1.0834	1.1400
SD/TDS	mg/l	109015	112595	107775	-	95895	117410
Acidité/Acidity	mg/l CaCO3	65195	68425	64844	46000	57404	70392
Al	mg/l	4522	4413	3974	4200	3813	4833
Ca	mg/l	647	538	609	610	-	-
Cd	mg/l	1.25	-	-	-	-	-
Cu	mg/l	-	55	-	-	-	-
Fe tot	mg/l	16301	17875	15899	13800	14149	17046
Fe ++	mg/l	8282	7905	8109	8600	8166	8700
Fe +++	mg/l	8019	9970	7790	5200	5984	8346
K	mg/l	0.41	0.41	0.66	21		
Mg	mg/l	4217	4335	4012	3900	3620	4649
Mn tot	mg/l	279	254	241	250	-	-
Na	mg/l	109.1	18	6	10	-	-
Ni	mg/l	1.25	13	-	-	-	-
Pb	mg/l	1.3	1.35	-	-	-	-
Si	mg/l	-	95	-	-	-	-
SO4 =	mg/l	63511	66745	65387	77500	55788	69497
Zn	mg/l	25.8	23	-	-	-	-

BH-91-03 Roc/Rock		3/27/91	4/24/91	6/12/91	8/30/91	10/30/91	6/17/92
pH		2.32	2.25	2	2.34	2.16	2.5
EH	mV	398	407	386	-	391	282
Conduct.	µS	38809	37600	39172	45000	39413	36028
Densité/SG	g/cc	-	-	-	-	1.1531	1.1400
SD/TDS	mg/l	171580	173180	172860	1166	162545	171160
Acidité/Acidity	mg/l CaCO3	105651	103839	108008	85500	97766	103011
Al	mg/l	9110	7795	7524	7700	7171	7647
Ca	mg/l	636	510	603	580	-	-
Cd	mg/l	1.61	-	-	-	-	-
Cu	mg/l	-	111	-	-	-	-
Fe tot	mg/l	22311	24582	22344	20400	22792	23838
Fe ++	mg/l	12170	12138	10557	11600	13319	23206
Fe +++	mg/l	10141	12444	11787	8800	9473	632
K	mg/l	1.69	0.34	0.27	10	-	-
Mg	mg/l	7979	7714	6800	6800	7067	7569
Mn	mg/l	409	334	335	340	-	-
Na	mg/l	84.4	6	7	2	-	-
Ni	mg/l	29.6	26	-	-	-	-
Pb	mg/l	2.1	1.57	-	-	-	-
Si	mg/l	-	60	-	-	-	-
SO4 =	mg/l	107875	105311	106784	116500	99676	105655
Zn	mg/l	53.5	35	-	-	-	-

BH-91-03 Sol/Soil		3/27/91	4/24/91	6/12/91	8/30/91	10/30/91	6/17/92	8/15/92
pH		2.3	2.16	2	2.29	2.08	2.37	2.22
EH	mV	399	417	392	-	404	401	393
Conduct.	µS	38930	37721	38809	40000	35786	35424	36028
Densité/SG	g/cc	-	-	-	-	1.117	1.1400	1.143
SD/TDS	mg/l	-	173160	166895	1165	134255	180820	190850
Acidité/Acidity	mg/l CaCO3	105160	108008	102760	88000	80588	108900	115023
Al	mg/l	8696	7287	7261	7600	5675	8193	8772
Ca	mg/l	645	579	614	570	-	-	-
Cd	mg/l	1.59	-	-	-	-	-	-
Cu	mg/l	-	78	-	-	-	-	-
Fe tot	mg/l	21927	25194	20942	19400	19243	24991	26167
Fe ++	mg/l	11867	11271	9996	11300	9389	12754	14909
Fe +++	mg/l	10060	13923	10946	8100	9854	12237	11258
K	mg/l	0.3	0.15	<0,1	10	-	-	-
Mg	mg/l	7827	8797	6732	6800	5511	8146	8763
Mn tot	mg/l	405	319	320	340	-	-	-
Na	mg/l	645	5	1	1	-	-	-
Ni	mg/l	6.1	24	-	-	-	-	-
Pb	mg/l	2	1.73	-	-	-	-	-
Si	mg/l	-	66	-	-	-	-	-
SO4 =	mg/l	106928	104064	106043	100000	80535	112442	119583
Zn	mg/l	52.5	33	-	-	-	-	-

BH-91-04 Roc/Rock		3/26/91	4/24/91	6/13/91	8/30/91	30/10/91	17/6/92	8/15/92
pH		3.78	3.36	2.78	3.58	3.24	3.54	3.31
EH	mV	331	277	292	-	278	253	272
Conduct.	µS	25389	28291	26356	56000	31797	31192	27807
Densité/SG	g/cc	-	-	-	-	1.0749	1.0780	1.077
SD/TDS	mg/l	62905	73620	66525	1174	85310	91360	93780
Acidité/Acidit	mg/l	34120	41839	33844	36500	51029	54672	56130
y	CaCO3							
Al	mg/l	2277	2445	1887	2800	3333	3606	3716
Ca	mg/l	636	637	581	610	-	-	-
Cd	mg/l	0.86	-	-	-	-	-	-
Cu	mg/l	-	20	-	-	-	-	-
Fe tot	mg/l	8928	11194	9103	10900	12687	13526	13859
Fe ++	mg/l	8121	9129	7497	9800	*	*	*
Fe +++	mg/l	807	2065	1606	1100	*	*	*
K	mg/l	14.53	16.3	15.68	27	-	-	-
Mg	mg/l	3459	4335	3740	4500	3143	3413	3523
Mn	mg/l	389	413	385	410	-	-	-
Na	mg/l	282.2	52	45	28	-	-	-
Ni	mg/l	19.8	20	-	-	-	-	-
Pb	mg/l	1.1	1.11	-	-	-	-	-
Si	mg/l	-	50	-	-	-	-	-
SO4 =	mg/l	37399	45076	38928	65000	49204	52954	54464
Zn	mg/l	27	29	-	-	-	-	-

BH-91-04 Sol/Soil		3/26/91	4/24/91	6/13/91	8/30/91	10/30/91	17/06/92	8/15/92
pH		4.11	4.95	5.68	5.4	4.68	5.1	4.88
EH	mV	290	170	nd	-	190	169	217
Conduct.	µS	7218	4195	3325	4500	4232	4872	4594
Densité/SG	g/cc	-	-	-	-	1.0043	1.0060	1.005
SD/TDS	mg/l	10315	4807	3710	6019	4585	4600	6010
Acidité/Acidit	mg/l	2446	569	327	1350	850	854	1301
y	CaCO3							
Al	mg/l	97	6	1	91360	28	28	47
Ca	mg/l	512	402	343	500	-	-	-
Cd	mg/l	0.19	-	-	-	-	-	-
Cu	mg/l	-	0.3	-	-	-	-	-
Fe tot	mg/l	757	175	181	720	219	221	339
Fe ++	mg/l	434	168	108	375	*	*	*
Fe +++	mg/l	323	7	73	345	*	*	*
K	mg/l	10.38	8.16	8.16	28	-	-	-
Mg	mg/l	929	408	280	520	-	-	-
Mn tot	mg/l	211	61	34	62	-	-	-
Na	mg/l	49.5	37	30	37	-	-	-
Ni	mg/l	7.1	1	-	-	-	-	-
Pb	mg/l	0.3	0.33	-	-	-	-	-
Si	mg/l	-	25	-	-	-	-	-
SO4 =	mg/l	5999	2934	1751	3000	1998	2004	2619
Zn	mg/l	5.1	1	-	-	-	-	-

*: *EH < 300 mV*

BH-91-06 Roc/Rock		3/26/91	4/23/91	6/13/91	8/30/91	30/10/91	6/17/92	8/15/92
pH		3.3	2.37	2.75	3.25	3.16	3.60	3.36
EH	mV	336	375	358	-	241	209	226
Conduct.	µS	40985	43766	43645	45000	43161	41952	36270
Densité/SG	g/cc	-	-	-	-	1.1386	1.1500	1.15
SD/TDS	mg/l	153290	200530	174740	**175630**	161070	184800	186950
Acidité/Acidit	mg/l	85424	122134	98835	77500	**96869**	**111329**	**112641**
y	CaCO3							
Al	mg/l	6801	9610	7067	5200	**7090**	**8421**	**8545**
Ca	mg/l	688	528	637	680	-	-	-
Cd	mg/l	1.7	-	-	-	-	-	-
Cu	mg/l	-	76	-	-	-	-	-
Fe tot	mg/l	24631	26265	25181	25800	**22611**	**25460**	**25712**
Fe ++	mg/l	20806	19788	22848	13180	*	*	*
Fe +++	mg/l	3825	6477	2333	12620	*	*	*
K	mg/l	6.91	0.31	0.37	10	-	-	-
Mg	mg/l	7171	9626	7480	6400	**6983**	**8389**	**8521**
Mn	mg/l	437	456	421	390	-	-	-
Na	mg/l	688	18	16	23	-	-	-
Ni	mg/l	1.7	34	-	-	-	-	-
Pb	mg/l	2	1.82	-	-	-	-	-
Si	mg/l	-	97	-	-	-	-	-
SO4 =	mg/l	96147	123894	108595	95000	**98659**	**115264**	**116795**
Zn	mg/l	47.5	48	-	-	-	-	-

BH-91-06 Sol/Soil		30/10/91
pH		2.72
EH	mV	284
Conduct.	µS	44612
Densité/SG	g/cc	1.187
SD/TDS	mg/l	191545
Acidité/Acidit	mg/l	**115447**
y	CaCO3	
Al	mg/l	**8813**
Ca	mg/l	-
Cd	mg/l	-
Cu	mg/l	-
Fe tot	mg/l	**26247**
Fe ++	mg/l	*
Fe +++	mg/l	*
K	mg/l	-
Mg	mg/l	**8806**
Mn	mg/l	-
Na	mg/l	-
Ni	mg/l	-
Pb	mg/l	-
Si	mg/l	-
SO4 =	mg/l	**120081**
Zn	mg/l	-

**:EH < 300 mV*

BH-91-101 Roc/Rock		3/27/91	4/24/91	10/30/91
pH		6.7	5.93	3.81
EH	mV	-	317	401
Conduct.	µS	1765	2394	2805
Densité/SG	g/cc	-	-	1.0033
SD/TDS	mg/l	-	2397	3200
Acidité/Acidity	mg/l CaCO3	70	191	497
Al	mg/l	<1	1	14
Ca	mg/l	413	435	-
Cd	mg/l	0.04	-	-
Cu	mg/l	-	0.1	-
Fe tot	mg/l	0.14	0.7	127
Fe ++	mg/l	<0,1	<0,1	-
Fe +++	mg/l	<0,1	0.7	-
K	mg/l	27.27	14.8	-
Mg	mg/l	39.4	45	-
Mn	mg/l	21	32	-
Na	mg/l	17.2	12	-
Ni	mg/l	<0,1	<0,1	-
Pb	mg/l	<0,1	0.33	-
Si	mg/l	-	<0,1	-
SO4 =	mg/l	604	1344	1394
Zn	mg/l	0.2	0.9	-

BH-91-102 Roc/Rock		4/24/91	6/12/91	8/30/91	10/30/91	6/17/92	8/15/92
pH		6.75	6.33	6.22	5.93	6.12	6.19
EH	mV	296	442		387	346	238
Conduct.	µS	2370	3554	3400	3409	3325	3397
Densité/SG	g/cc	-	-	-	1.0034	1.0040	1.008
SD/TDS	mg/l	2287	3940	1535	3475	2130	3600
Acidité/Acidity	mg/l CaCO3	387	265	250	560	281	590
Al	mg/l	<1	1	22	17	7	18
Ca	mg/l	446	671	980	-	-	-
Cd	mg/l	-	-	-	-	-	-
Cu	mg/l	<0,1	-	-	-	-	-
Fe tot	mg/l	0.5	2	57	143	71	151
Fe ++	mg/l	<0,1	<0,1	3.5	-	-	-
Fe +++	mg/l	0.5	2	53.5	-	-	-
K	mg/l	6.5	5.07	9.9	-	-	-
Mg	mg/l	47	171	210	-	-	-
Mn	mg/l	11	47	71	-	-	-
Na	mg/l	22	21	19	-	-	-
Ni	mg/l	<0,1	-	-	-	-	-
Pb	mg/l	0.33	-	-	-	-	-
Si	mg/l	<0,1	-	-	-	-	-
SO4 =	mg/l	1111	1988	2350	1514	928	1569
Zn	mg/l	0.1	-	-	-	-	-

BH-91-103 Roc/Rock		4/24/91	6/12/91	8/30/91	10/30/91
pH		2.53	2.16	4.24	2.18
EH	mV	470	463	-	493
Conduct.	µS	10470	10941	2200	11268
Densité/SG	g/cc	-	-	-	1.0332
SD/TDS	mg/l	33640	35500	-	39005
Acidité/Acidit	mg/l	21190	22906	400	23254
y	CaCO3				
Al	mg/l	1430	1546	100	1406
Ca	mg/l	301	403	340	-
Cd	mg/l	-	-	-	-
Cu	mg/l	14	-	-	-
Fe tot	mg/l	5941	5444	9.1	5999
Fe ++	mg/l	510	673	1.4	373
Fe +++	mg/l	5431	4771	7.7	5626
K	mg/l	12.62	2.57	11	-
Mg	mg/l	586	612	39	1281
Mn	mg/l	31	40	29	-
Na	mg/l	15	15	15	-
Ni	mg/l	4	-	-	-
Pb	mg/l	0.71	-	-	-
Si	mg/l	61	-	-	-
SO4 =	mg/l	13711	19176	1750	21644
Zn	mg/l	4	-	-	-

BH-91-104 Roc/Rock		3/27/91	4/25/91	6/12/91	8/30/91	10/30/91	6/17/92	8/15/92
pH		2.32	2.61	2.23	2.64	2.55	2.74	2.57
EH	mV	446	427	407	-	411	406	238
Conduct.	µS	21762	21931	19828	22000	17809	20795	20311
Densité/SG	g/cc	-	-	-	-	1.038	1.0500	1.047
SD/TDS	mg/l	81700	62345	55275	48490	43125	63710	60020
Acidité/Acidit	mg/l	49683	40711	34825	36500	25718	38050	35836
y	CaCO3							
Al	mg/l	3772	3704	3136	3300	1566	2399	2246
Ca	mg/l	423	408	442	420	-	-	-
Cd	mg/l	1	-	-	-	-	-	-
Cu	mg/l	-	44	-	-	-	-	-
Fe tot	mg/l	11413	6158	4105	7000	6613	9626	9093
Fe ++	mg/l	2171	2295	1683	2000	2883	4553	9027
Fe +++	mg/l	9242	3863	2422	5000	3731	5073	66
K	mg/l	0.34	1.29	0.27	20			
Mg	mg/l	2676	2550	1963	2200	1432	2229	2080
Mn	mg/l	173	251	247	190	-	-	-
Na	mg/l	127.3	15	7	9	-	-	-
Ni	mg/l	15.7	22	-	-	-	-	-
Pb	mg/l	1.2	1.08	-	-	-	-	-
Si	mg/l		64	-	-	-	-	-
SO4 =	mg/l	45862	33015	31891	52500	24014	36096	33901
Zn	mg/l	15.8	16	-	-	-	-	-

BH-91-105 Roc/Rock		3/28/91	4/25/91	6/13/91	8/30/91	10/30/91	6/17/92	8/15/92
pH		5.82	6.24	6	6.39	6.01	6.12	6.1
EH	mV	380	383	442	-	426	355	324
Conduct.	µS	151	150	91	100	169	145	121
Densité/SG	g/cc	-	-	-	-	0.9995	1.0010	1.003
SD/TDS	mg/l	207	215	425	-	20	100	-
Acidité/Acidity	mg/l CaCO3	11	10	9	20	2	9	-
Al	mg/l	<1	1	8	81	<1	<1	-
Ca	mg/l	18	50	9	18	-	-	-
Cd	mg/l	<0,1	-	-	-	-	-	-
Cu	mg/l	-	<0,1	-	-	-	-	-
Fe tot	mg/l	0.24	1.6	7	96	<1	2	-
Fe ++	mg/l	<0,1	<0,1	1	16	*	*	*
Fe +++	mg/l	0.24	1.6	6	80	*	*	*
K	mg/l	1.45	0.9	1.26	7.1	-	-	-
Mg	mg/l	3.5	10	4	32	-	-	-
Mn	mg/l	0.2	0.1	0.16	3.3	-	-	-
Na	mg/l	15.9	4	7	3	-	-	-
Ni	mg/l	<0,1	<0,1	-	-	-	-	-
Pb	mg/l	<0,1	0.24	-	-	-	-	-
Si	mg/l	-	<0,1	-	<5	-	-	-
SO4 =	mg/l	<1	50	<1	65	9	44	*
Zn	mg/l	0.04	<0,1	-	-	-	-	-

*: *EH < 300 mV*

BH-91-105 Sol/Soil		4/25/91
pH		6.83
EH	mV	337
Conduct.	µS	319
Densité/SG	g/cc	-
SD/TDS	mg/l	225
Acidité/Acidity	mg/l CaCO3	14
Al	mg/l	<1
Ca	mg/l	75
Cd	mg/l	-
Cu	mg/l	<0,1
Fe tot	mg/l	0.3
Fe ++	mg/l	<0,1
Fe +++	mg/l	0.3
K	mg/l	6.5
Mg	mg/l	18
Mn tot	mg/l	0.2
Na	mg/l	5
Ni	mg/l	<0,1
Pb	mg/l	0.24
Si	mg/l	<0,1
SO4 =	mg/l	63
Zn	mg/l	<0,1

BH-91-106 Roc/Rock		3/28/91	4/25/91	6/13/91	8/30/91	10/30/91	6/13/92	6/19/92	8/15/92
pH		5.97	5.94	5.72	5.04	2.81	3.3	3.21	2.58
EH	mV	335	340	275	-	577	410	396	450
Conduct.	µS	2636	3252	3434	3700	4691	5501	6698	7048
Densité/SG	g/cc	-	-	-	-	1.0048	1.0070	1.0080	1.009
SD/TDS	mg/l	2595	3252	5925	2705	5160	5800	7910	9950
Acidité/Acidity	mg/l CaCO3	540	444	229	120	1021	1229	2039	3007
Al	mg/l	<1	1	3	39	35	44	80	125
Ca	mg/l	618	1492	713	720	-	-	-	-
Cd	mg/l	0.04	-	-	-	-	-	-	-
Cu	mg/l	-	<0,1	-	-	-	-	-	-
Fe tot	mg/l	0.11	1.3	7	230	265	320	536	796
Fe ++	mg/l	<0,1	<0,1	<0,1	50	-	-	-	-
Fe +++	mg/l	0.11	1.3	7	280	-	-	-	-
K	mg/l	3.12	3.63	2.29	9.6	-	-	-	-
Mg	mg/l	86.8	144	166	230	-	-	-	-
Mn	mg/l	37	55	96	140	-	-	-	-
Na	mg/l	15.1	26	12	12	-	-	-	-
Ni	mg/l	0.7	2	-	-	-	-	-	-
Pb	mg/l	<0,1	0.46	-	-	-	-	-	-
Si	mg/l	-	<0,1	-	10	-	-	-	-
SO4 =	mg/l	1317	1958	2100	2550	2248	2527	3446	4335
Zn	mg/l	0.3	0.4	-	-	-	-	-	-

BH-91-106 Sol/Soil		3/28/91	4/25/91	6/13/91	8/30/91	10/30/91	6/13/92	6/19/92	8/15/92
pH		6.03	6.16	6.25	6.25	5.87		4.67	4.85
EH	mV	290	333	230	-	396	317	266	362
Conduct.	µS	1826	2394	2031	2000	2865	3554	4630	3591
Densité/SG	g/cc	-	-	-	-	1.0024	1.0040	1.0080	1.003
SD/TDS	mg/l	1895	2072	2165	-	2725	2620	4400	4130
Acidité/Acidity	mg/l CaCO3	344	304	93	250	395	374	798	725
Al	mg/l	<1	<1	<1	200	11	10	26	23
Ca	mg/l	472	3226	407	490	-	-	-	-
Cd	mg/l	0.03	-	-	-	-	-	-	-
Cu	mg/l	-	<0,1	-	-	-	-	-	-
Fe tot	mg/l	0.14	0.3	1	340	100	95	206	186
Fe ++	mg/l	<0.1	<0,1	<0,1	54	-	-	-	-
Fe +++	mg/l	0.14	0.3	1	286	-	-	-	-
K	mg/l	5.28	5.14	1.76	21	-	-	-	-
Mg	mg/l	64.6	102	69	210	-	-	-	-
Mn tot	mg/l	21	20	21	46	-	-	-	-
Na	mg/l	12.1	21	7	16	-	-	-	-
Ni	mg/l	<0,1	0.2	-	-	-	-	-	-
Pb	mg/l	<0,1	0.36	-	-	-	-	-	-
Si	mg/l	-	<0,1	-	10	-	-	-	-
SO4 =	mg/l	878	1278	864	1400	1187	1142	1917	1799
Zn	mg/l	0.1	0.1	-	-	-	-	-	-

BH-91-107 Roc/Rock		3/28/91	4/25/91	6/12/91	8/30/91	10/30/91	6/17/92	8/15/92
pH		2.44	2.53	2.23	2.72	2.47	2.71	2.53
EH	mV	394	394	417	-	380	283	382
Conduct.	µS	26235	27807	26840	27000	24422	25147	27092
Densité/SG	g/cc	-	-	-	-	1.0584	1.0800	1.078
SD/TDS	mg/l	82785	84050	89320	1168	66090	85160	89410
Acidité/Acidity	mg/l CaCO3	46738	53955	51993	40000	39478	50939	53497
Al	mg/l	3700	3618	3550	3200	2499	3326	3517
Ca	mg/l	631	534	621	590	-	-	-
Cd	mg/l	1.07	-	-	-	-	-	-
Cu	mg/l	-	61	-	-	-	-	-
Fe tot	mg/l	11979	13107	12661	10200	9968	12666	13256
Fe ++	mg/l	7070	8313	6375	6450	6594	12320	8590
Fe +++	mg/l	4909	4794	6286	3750	3374	346	4666
K	mg/l	0.81	0.22	-	10	-	-	-
Mg	mg/l	2929	3825	3009	2600	2325	3136	3325
Mn	mg/l	240	246	238	270	-	-	-
Na	mg/l	147.5	16	8	9	-	-	-
Ni	mg/l	15.1	17	-	-	-	-	-
Pb	mg/l	1.1	1.08	-	-	-	-	-
Si	mg/l	-	88	-	-	-	-	-
SO4 =	mg/l	46043	47623	51931	57500	37519	49111	51742
Zn	mg/l	27.9	30	-	-	-	-	-

BH-W3		4/8/91	4/25/91	6/12/91	8/30/91	10/30/91	6/19/92	8/15/92
pH		2.49	2.61	2.3	2.69	2.38	2.7	2.49
EH	mV	423	421	422	-	428	445	411
Conduct.	µS	13420	13178	14145	9000	12005	7846	14508
Densité/SG	g/cc	-	-	-	-	1.0242	1.017	1.039
SD/TDS	mg/l	30315	31445	32930	1168	26255	14360	37640
Acidité/Acidity	mg/l CaCO3	19620	20110	20110	10750	15638	8546	22438
Al	mg/l	1430	1346	1443	910	925	495	1353
Ca	mg/l	424	413	482	460	-	-	-
Cd	mg/l	-	-	-	-	-	-	-
Cu	mg/l	21	20	-	-	-	-	-
Fe tot	mg/l	3825	4169	4156	2700	4075	2248	5795
Fe ++	mg/l	1810	1938	1938	1950	1293	491	2526
Fe +++	mg/l	2015	2231	2218	750	2783	1757	3269
K	mg/l	0.37	0.45	1.02	7.5	-	-	-
Mg	mg/l	1122	1020	1122	600	834	441	1232
Mn	mg/l	208	196	198	220	-	-	-
Na	mg/l	22	18	10	9.5	-	-	-
Ni	mg/l	8	8	-	-	-	-	-
Pb	mg/l	0.7	0.59	-	-	-	-	-
Si	mg/l	77	78	-	-	-	-	-
SO4 =	mg/l	17610	17552	18209	15500	14411	7801	20863
Zn	mg/l	11	11	-	-	-	-	-

APPENDIX C-1

Chemical data from ditch monitoring stations (weekly sampling 1991-1992)

Station 510		1/22/91	1/24/91	1/30/91	2/5/91	2/13/91	2/21/91	2/26/91	3/5/91	3/11/91	3/18/91	3/25/91	4/2/91
laboratory		2	2	2	2	2	2	2	2	1	1	1	1
Acidité/Acidity	mg/l	47500	50000	50000	53700	58700	60000	53750	57500	61859	53365	61957	54396
Al	mg/l	nd	nd	nd	nd	nd	4300	4300	4200	4264	3886	4074	3062
Ca	mg/l	451	473	450	487	491	410	509	480	643	616	618	567
Cd	mg/l	0.12	0.12	0.03	0.05	0.05	0.05	0.05	0.05	1.29	1.27	1.31	1.18
Cl	mg/l	55	55	55									
Conduct.	µS	28000	26000	33000	42000	30000	34000	29000	32000	27928	27927	28532	25026
Cu	mg/l	51	50	50	50	59	49	51	54	na	na	na	na
Fe tot	mg/l	17400	8400	14900	12600	18700	11100	9300	20000	16877	16816	17715	15524
Fe ++	mg/l	6000	6000	5200	7200	6900	7000	6800	5900	6110	5706	6413	4646
Fe +++	mg/l	11400	2400	9700	5400	11800	4100	2500	14000	10767	11110	11302	10878
K	mg/l	36	29	31	36	49	49	47	49	0.26	0.21	0.15	0.15
SD/TDS	mg/l	11800	98000	98000	104800	110700	112700	107800	103400	105335	102565	107120	91610
Mg	mg/l	3200	1600	3000	3400	3400	1800	3400	3400	3686	3585	3737	2878
Mn tot	mg/l	221	225	188	219	263	259	245	252	268	242	249	186
Na	mg/l	5.4	5.4	5.4	8	8.5	8.3	7.4	6.9	1.27	1.04	0.95	1.17
Ni	mg/l	9.1	8.4	8.2	8.9	11	9.2	10	11	11.6	12	12.4	10.1
Pb	mg/l	0.5	0.5	0.5	0.05	0.5	4.1	1.3	1.9	1.2	1.1	1.2	1.1
Si	mg/l									na	na	na	na
SO4 =	mg/l	77500	55000	58000	71250	85000	75000	75000	85000	61556	60696	62939	53462
Zn	mg/l	25	26	24	24	27	23	25	25	27.1	25	26.5	19.4
pH		2.24	2.2	2.34	2.21	2.14	2.14	2.15	2.15	2.13	2.14	2.1	2.02
Eh	mV									434	435	435	441

Station 510		4/9/91	4/15/91	4/22/91	4/29/91	5/7/91	5/13/91	5/20/91	5/27/91	6/3/91	6/10/91	6/16/91	7/3/91
laboratory		1	1	1	1	1	1	1	1	1	1	1	2
Acidité/Acidity	mg/l	34923	43360	42183	51649	52238	62784	61803	63274	59105	65236	61312	50250
Al	mg/l	1979	2507	2507	2996	3195	3731	3609	3550	3430	3852	3550	3450
Ca	mg/l	386	419	379	444	519	590	598	584	572	617	584	
Cd	mg/l	na	na	na	na								
Conduct.	µS	19525	23370	23358	27082	27686	30709	30830	31192	30466	31313	31434	39950
Cu	mg/l	30	38	39	44								
Fe tot	mg/l	10582	12240	11233	13693	13974	16474	16537	16294	15988	17302	16473	14500
Fe ++	mg/l	2346	4182	4284	4539	3009	3927	3672	4182	4182	3723	4794	
Fe +++	mg/l	8236	8058	6949	9154	10965	12546	12865	12112	11806	13579	11679	
K	mg/l	0.12	0.15	0.15	0.12	<0,1	<0,1	<0,1	0.22	<0,1	<0,1	0.19	
SD/TDS	mg/l	58700	70995	69605	82255	86455	102025	102125	101940	99335	110185	100960	
Mg	mg/l	1938	2448	2652	2881	3009	3621	3595	3595	3468	3825	3799	
Mn tot	mg/l	120	152	144	173	186	218	222	222	212	234	231	
Na	mg/l	599	510	510	382	5	7	5	3	6	2	5	
Ni	mg/l	6	8	8	9								
Pb	mg/l	0.76	0.89	0.8	0.93								
Si	mg/l	51	58	56	63								
SO4 =	mg/l	34097	39730	41347	48627	49051	58886	62918	59997	56170	63577	56540	72500
Zn	mg/l	13	18	16	19								
pH		2.29	2.33	2.35	2.26	2.33	2.33	2.35	2.38	2.37	2.37	2.37	2.21
Eh	mV	451	429	435	435	424	422	421	421	420	423	417	

Station 510		7/10/91	7/16/91	7/23/91	7/30/91	8/7/91	8/14/91	8/21/91	8/27/91	9/4/91	9/11/91	9/18/91	9/25/91
laboratory		2	2	2	2	2	2	2	2	2	2	2	2
Acidité/Acidity	mg/l	52500	*71897*	*73168*	*94572*	*120144*		*61327*	*62051*	*58070*	50000	*52648*	*55660*
Al	mg/l	3400	*4955*	*5059*	*7012*	*9221*	3720	*4115*	*4171*	*3864*		*3454*	*3680*
Ca	mg/l	470					590				650		
Conduct.	µS	29500	42500	42500	32000	37000	23000	28000	30000	47000	43000	43500	39000
Fe tot	mg/l	14000	*17375*	*17651*	*21328*	*26715*	15200	*15036*	*15199*	*14301*	17600	*13061*	*13752*
Fe ++	mg/l	4200					5000				5000		
Fe +++	mg/l	9800					10200				12600		
SD/TDS	mg/l	100000	119900	122000	222000	23700	93600	102400	103600	97000	98200	88000	93000
Mg	mg/l	3100	*4773*	*4879*	*6896*	*9224*	3400	*3923*	*3979*	*3671*	3800	*3262*	*3487*
Mn tot	mg/l	200					220				250		
SO4 =	mg/l	*58370*	*71112*	*72478*	*96626*	*124679*	60000	*59887*	*60647*	*56482*	58000	*50867*	*53977*
pH		2.24	2.27	2.16	2.16	2.13	2.23	2.27	2.19	2.22	2.26	2.25	2.24
Eh	mV												

Station 510		10/7/91	10/16/91	10/23/91	10/29/91	11/7/91	11/13/91	11/19/91	11/26/91	12/4/91	12/11/91	12/18/91	12/24/91
laboratory		2	2	2	2	2	2	2	2	2	2	2	2
Acidité/Acidity	mg/l	*46993*	*53792*	25000	*49880*	*55840*	*56804*	*54334*	*51986*	*38884*	*58733*	*57106*	*60482*
Al	mg/l	*3037*	*3539*	3500	*3248*	3200	*3767*	*3580*	*3404*	*2458*	*3915*	*3790*	*4050*
Ca	mg/l			560		520							
Conduct.	µS	35000	36000	30000	49000	34000	35000	37000	35000	32000	28000	43000	44000
Fe tot	mg/l	*11747*	*13324*	14000	*12420*	14700	*14013*	*13449*	*12908*	*9826*	*14451*	*14082*	*14846*
Fe ++	mg/l			4800		4800							
Fe +++	mg/l			9200		9900							
SD/TDS	mg/l	78600	89900	105000	83400	93300	94900	90800	86900	65100	98100	95400	101000
Mg	mg/l	*2850*	*3347*	3100	*3058*	3100	*3574*	*3388*	*3213*	*2285*	*3722*	*3597*	*3857*
Mn tot	mg/l			210		220							
SO4 =	mg/l	*45085*	*52046*	58000	*48027*	55000	*55165*	*52606*	*50186*	*36926*	*57173*	*55478*	*59001*
pH		2.24	2.21	2.23	2.41	2.17	2.28	2.2	2.34	2.29	2.32	2.35	2.26
Eh	mV												

Station 510		12/30/91	1/8/92	1/15/92	1/30/92	gelé/frozen	3/31/92	4/8/92	4/14/92	4/22/92	4/30/92	5/7/92	5/13/92
laboratory		2	2	2	2		2	2	2	2	2	2	2
Acidité/Acidity	mg/l	*58794*	*61689*	*60181*	*68693*		*71958*	*54455*	*71958*	*13100*	*52046*	*54455*	*32228*
Al	mg/l	*3919*	*4143*	*4026*	*4697*		*4960*	*3589*	*4960*	*769*	*3409*	*3589*	*1999*
Ca	mg/l												
Conduct.	µS	38000	48000	42000	39000		31000	23000	33000	17000	52000	24000	20000
Fe tot	mg/l	*14465*	*15117*	*14778*	*16674*		*17388*	*13476*	*17388*	*3425*	*12922*	*13476*	*8217*
Fe ++	mg/l												
Fe +++	mg/l												
SD/TDS	mg/l	98200	103000	100500	114600		120000	91000	120000	22000	87000	91000	54000
Mg	mg/l	*3726*	*3951*	*3833*	*4510*		*4778*	*3397*	*4778*	*691*	*3217*	*3397*	*1844*
Mn tot	mg/l												
SO4 =	mg/l	*57236*	*60267*	*58686*	*67682*		*71177*	*52730*	*71177*	*12031*	*50248*	*52730*	*30347*
pH		2.16	na	2.44	2.23		2.34	2.2	2.2	2.7	2.2	2.2	2.4
Eh	mV												

Station 510		5/21/92	5/27/92	6/3/92	6/11/92	6/17/92	6/23/92	6/30/92	7/7/92	7/16/92	7/21/92	7/28/92	8/4/92
laboratory		2	2			2	2	2	2	2	2	2	2
Acidité/Acidity	mg/l	*58673*	*59879*	*78010*	*59879*	*65914*	*59879*	*71958*	*55057*	*65914*	*59879*	*65914*	*65914*
Al	mg/l	*3910*	*4003*	*5459*	*4003*	*4475*	*4003*	*4960*	*3635*	*4475*	*4003*	*4475*	*4475*
Ca	mg/l												
Conduct.	µS	40000	37000										
Fe tot	mg/l	*14437*	*14710*	13700	13100	15300	14200	15800	15400	15600	14400	14100	14700
Fe ++	mg/l												
Fe +++	mg/l												
SD/TDS	mg/l	98000	100000	130000	100000	110000	100000	120000	92000	110000	100000	110000	110000
Mg	mg/l	*3717*	*3810*	*5288*	*3810*	*4286*	*3810*	*4778*	*3442*	*4286*	*3810*	*4286*	*4286*
Mn tot	mg/l												
SO4 =	mg/l	*57110*	*58370*	*77722*	*58370*	*64726*	*58370*	*71177*	*53353*	*64726*	*58370*	*64726*	*64726*
pH		2.2	2.2										
Eh	mV												

Station 510		8/12/92	8/19/92	8/25/92	9/1/92	9/8/92	9/15/92	9/24/92	9/29/92	10/8/92	10/14/92	10/20/92	10/26/92
laboratory		2	2	2	2	2							
Acidité/Acidity	mg/l	*64706*	*65914*	*64706*	*54876*	*56865*	*57287*	*59879*	*48436*	*59879*	*55057*	*57467*	*55057*
Al	mg/l	*4380*	*4475*	*4380*	*3621*	*3772*	*3804*	*4003*	*3142*	*4003*	*3635*	*3818*	*3635*
Ca	mg/l												
Conduct.	µS												
Fe tot	mg/l	14400	16400	15100	13500	13900	13300	14100	12700	15100	14000	13400	14000
Fe ++	mg/l												
Fe +++	mg/l												
SD/TDS	mg/l	108000	110000	108000	91700	95000	95700	100000	81000	100000	92000	96000	92000
Mg	mg/l	*4189*	*4286*	*4189*	*3428*	*3579*	*3611*	*3810*	*2954*	*3810*	*3442*	*3625*	*3442*
Mn tot	mg/l												
SO4 =	mg/l	*63447*	*64726*	*63447*	*53166*	*55227*	*55666*	*58370*	*46553*	*58370*	*53353*	*55854*	*53353*
pH													
Eh	mV												

Station 510		11/5/92	11/10/92	11/17/92	11/24/92	12/1/92	12/8/92	12/15/92	12/22/92	12/30/92
laboratory		2	2	2	2	2				
Acidité/Acidity	mg/l	*55660*	*58673*	*51444*	*57829*	*59879*	*59879*	*66518*	*59879*	*65914*
Al	mg/l	*3680*	*3910*	*3364*	*3845*	*4003*	*4003*	*4523*	*4003*	*4475*
Ca	mg/l									
Conduct.	µS									
Fe tot	mg/l	12500	15000	14200	14100	15700	17000	15900	16300	15900
Fe ++	mg/l									
Fe +++	mg/l									
SD/TDS	mg/l	93000	98000	86000	96600	100000	100000	111000	100000	110000
Mg	mg/l	*3487*	*3717*	*3173*	*3652*	*3810*	*3810*	*4334*	*3810*	*4286*
Mn tot	Mg/l									
SO4 =	Mg/l	*53977*	*57110*	*49630*	*56230*	*58370*	*58370*	*65367*	*58370*	*64726*
pH										
Eh	MV									

Station 511		1/22/91	1/24/91	1/30/91	2/5/91	2/13/91	2/21/91	3/26/91	3/5/91	3/11/91	3/18/91	3/25/91	4/2/91
Lab		2	2	2	2	2	2	2	2	1	1	1	1
Acidité/Acidity	mg/l	58750	60000	57500	53800	62750	60000	65000	57500	61269	53365	60484	51549
Al	mg/l						5700	5200	4800	4222	4032	4328	3438
Ca	mg/l	373	389	388	400	406	464	399	390	532	489	506	523
Cd	mg/l	0.09	0.08	0.08	0.05	0.05	0.05	0.05	0.05	1.16	1.01	1.17	1.01
Cl	mg/l	55	55	55									
Conduct.	µS	27000	27000	34000	34000	29000	28300	29000	31000	25994	22971	25631	22971
Cu	mg/l	57	63	61	48	60	53	58	56	na	na	na	na
Fe tot	mg/l	16600	17800	16200	8000	18000	9700	8700	15000	14605	12665	15211	13130
Fe ++	mg/l	1700	1800	1400	1680	1860	2000	1800	1780	1767	909	1666	1313
Fe +++	mg/l	14900	16000	14800	6320	16000	9700	6900	13000	12838	11756	13545	11817
K	mg/l	33	35	37	43	40	47	62	56	0.62	0.3	0.26	0.62
SD/TDS	mg/l	141000	130000	11800	102000	121700	123300	121100	116060	104250	89790	105600	88565
Mg	mg/l	3100	3400	4000	2900	4200	2400	3700	2900	3964	3131	3611	2979
Mn tot	mg/l	255	282	274	205	254	275	267	247	235	186	195	166
Na	mg/l	6.9	6	6.3	8.8	8.5	8.3	8	7.7	17.2	108.1	91.9	107.1
Ni	mg/l	11	12	10	8.9	12	12	12	11	12.6	11	12.5	10
Pb	mg/l	0.5	0.5	0.5	0.05	0.5	4.3	2.4	1.8	1.2	1.2	1.2	1.1
Si	mg/l									na	na	na	na
SO4 =	mg/l	77500	80000	82500	71250	85000	78750	80000	92500	62173	52125	62190	50623
Zn	mg/l	24	27	25	19	24	22	23	22	23	19.5	20	17.7
PH		2.25	2.18	2.34	2.27	2.12	2.12	2.15	2.15	2.12	2.12	2.09	2.01
EH	mV									475	485	474	492

Station 511		4/9/91	4/15/91	4/22/91	4/29/91	5/7/91	5/13/91	5/20/91	5/27/91	6/3/91	6/10/91	6/16/91	7/3/91
lab		1	1	1	1	1	1	1	1	1	1	1	2
Acidité/Acidity	mg/l	19620	14617	15941	21484	28057	37278	40711	38847	29920	55181	52729	60000
Al	mg/l	1030	802	882	1346	1768	2346	2736	2624	1994	3790	3550	
Ca	mg/l	266	208	186	215	334	391	417	412	324	454	433	
Cd	mg/l	na	na	na	na								
Conduct.	µS	11304	9333	9636	12876	16370	19537	21037	21061	17216	26719	26598	
Cu	mg/l	14	10	14	19								
Fe tot	mg/l	5087	3519	3876	4883	6222	8109	8938	8428	6069	11628	10837	14200
Fe ++	mg/l	21	52	135	304	48	82	156	158	95	360	476	
Fe +++	mg/l	5066	3467	3741	4579	6174	8027	8782	8270	5974	11268	10361	
K	mg/l	0.45	0.71	0.66	0.66	<0,1	<0,1	<0,1	0.32	0.27	0.22	0.32	
SD/TDS	mg/l	31385	22870	24250	34180	46700	58825	68145	64445	48755	89685	87785	
Mg	mg/l	1045	714	765	1479	1708	2142	2448	2320	1887	3493	3442	
Mn tot	mg/l	48	39	42	61	97	129	145	152	111	200	191	
Na	mg/l	4	11	6	16	4	6	4	8	6	4	3	
Ni	mg/l	3	3	3	5								
Pb	mg/l	0.52	0.39	0.52	0.65								
Si	mg/l	36	31	29	36								
SO4 =	mg/l	15061	10851	9629	16731	27035	35471	39874	38105	28270	51232	52301	72500
Zn	mg/l	6	5	5	7								
pH		2.35	2.49	2.5	2.41	2.49	2.45	2.42	2.44	2.53	2.47	2.44	2.23
EH	mV	567	521	501	483	645	652	524	513	648	446	450	

Station 511		7/10/91	7/16/91	7/23/91	7/30/91	8/7/91	8/14/91	8/21/91	8/27/91	9/4/91	9/11/91	9/18/91	9/25/91
lab		2	2	2	2	2	na	2	2	2	2	2	2
Acidité/Acidity	mg/l	52500	*70506*	*91355*	*89829*	*120144*		*78616*	*73833*	*54756*	43000	*47895*	*31988*
Al	mg/l	4000	*4843*	*6601*	*6608*	*9221*		*5509*	*5113*	*3612*		*3102*	*1983*
Ca	mg/l	470									460		
Conduct.	µS	26500	38500	40500	31000	37000		30000	30000	41000	38000	37000	26000
Fe tot	mg/l	11300	*17071*	*21490*	*20315*	*26715*		*18823*	*17795*	*13545*	10400	*11958*	*8158*
Fe ++	mg/l	1520									6060		
Fe +++	mg/l	9780									4340		
SD/TDS	mg/l	98900	117600	152000	270300	28000		131000	123100	91500	92900	80100	53600
Mg	mg/l	3200	*4659*	*6471*	*6473*	*9224*		*5340*	*4935*	*3419*	3100	*2915*	*1828*
Mn tot	mg/l	200									190		
SO4 =	mg/l	42500	*69620*	*92453*	*91449*	*124679*		*78381*	*73196*	*53041*	51000	*46002*	*30112*
pH		2.27	2.3	2.16	2.22	2.17		2.27	2.19	2.27	2.33	2.32	2.36
EH	mV												

Station 511		10/7/91	10/16/91	10/23/91	10/29/91	11/7/91	11/13/91	11/19/91	11/26/91	12/4/91	12/11/91	12/18/91	12/24/91
lab		2	2	2	2	2	2	2	2	2	2	2	2
Acidité/Acidity	mg/l	*33666*	*31929*	15000	*20382*	*29359*	*33367*	*30671*	*24207*	*24447*	*39964*	*36484*	*51444*
Al	mg/l	*2097*	*1979*	2500	*1222*	2100	*2077*	*1894*	*1468*	*1483*	*2533*	*2291*	*3364*
Ca	mg/l			380		320							
Conduct.	µS	25000	23000	27000	24000	20000	22000	22000	19000	22000	20000	30000	35000
Fe tot	mg/l	*8567*	*8144*	7200	*5278*	*7542*	*8494*	*7836*	*6238*	*6297*	*10085*	*9249*	*12783*
Fe ++	mg/l			600		540							
Fe +++	mg/l			6600		6360							
SD/TDS	mg/l	56400	53500	65400	34200	49400	55900	51400	40600	41000	66900	61100	86000
Mg	mg/l	*1937*	*1824*	2000	*1109*	1700	*1918*	*1744*	*1339*	*1354*	*2358*	*2124*	*3173*
Mn tot	mg/l			140		110							
SO4 =	mg/l	*31760*	*30054*	37000	*18900*	32000	*31465*	*28823*	*22560*	*22790*	*38004*	*34542*	*49630*
pH		2.35	2.35	2.39	2.62	2.33	2.44	2.52	2.62	2.36	2.49	2.3	2.38
EH	mV												

Station 511		12/30/91	1/8/92	1/15/92	1/30/92		3/31/92	4/8/92	4/14/92	4/22/92	4/30/92	5/7/92	5/13/92
lab		2	gelé/frozen	gelé/frozen	2	gelé/frozen	2	2	2	2	2	2	2
Acidité/Acidity	mg/l	*62292*			*70144*		*55660*	*55057*	*44228*	*6545*	*21458*	*22653*	*10119*
Al	mg/l	*4190*			*4813*		*3680*	*3635*	*2837*	*376*	*1291*	*1367*	*588*
Ca	mg/l												
Conduct.	µS	34000			39000		23000	23000	22000	5800	26000	13000	7800
Fe tot	mg/l	*15253*			*16992*		*13752*	*13614*	*11097*	*1726*	*5549*	*5849*	*2656*
Fe ++	mg/l												
Fe +++	mg/l												
SD/TDS	mg/l	104000			117000		93000	92000	74000	11000	36000	38000	17000
Mg	mg/l	*3998*			*4629*		*3487*	*3442*	*2654*	*335*	*1173*	*1245*	*526*
Mn tot	mg/l												
SO4 =	mg/l	*60901*			*69232*		*53977*	*53353*	*42286*	*5959*	*19926*	*21069*	*9257*
pH		2.23			2.3		2.46	2.15	2.2	2.7	2.1	2.4	2.7
EH	mV												

Station 511		5/21/92	5/27/92	6/3/92	6/11/92	6/17/92	6/23/92	6/30/92	7/7/92	7/16/92	7/21/92	7/28/92	8/4/92
lab		2	2	2	2	2	2	2	2	2	2	2	2
Acidité/Acidity	mg/l	*25643*	*43627*	*53852*	*38224*	*55660*	*29832*	*49037*	*29234*	*57467*	*50842*	*57467*	*55057*
Al	mg/l	*1561*	*2793*	*3544*	*2411*	*3680*	*1838*	*3186*	*1798*	*3818*	*3319*	*3818*	*3635*
Ca	mg/l												
Conduct.	µS	21000	26000										
Fe tot	mg/l	*6595*	*10955*	7810	7050	11400	5660	9900	5830	12500	9840	10700	9540
Fe ++	mg/l												
Fe +++	mg/l												
SD/TDS	mg/l	43000	73000	90000	64000	93000	50000	82000	49000	96000	85000	96000	92000
Mg	mg/l	*1428*	*2612*	*3352*	*2240*	*3487*	*1690*	*2997*	*1652*	*3625*	*3129*	*3625*	*3442*
Mn tot	mg/l												
SO4 =	mg/l	*23942*	*41680*	*52108*	*36269*	*53977*	*28005*	*47167*	*27422*	*55854*	*49013*	*55854*	*53353*
pH		2.4	2.3										
EH	mV												

Station 511		8/12/92	8/19/92	8/25/92	9/1/92	9/8/92	9/15/92	9/24/92	9/29/92	10/8/92	10/14/92	10/20/92	10/26/92
lab		2	2	2	2	2							
Acidité/Acidity	mg/l	*68935*	*78010*	*61689*	*41645*	*52648*	*47353*	*45430*	*28635*	*47835*	*34026*	*29234*	*38824*
Al	mg/l	*4716*	*5459*	*4143*	*2652*	*3454*	*3063*	*2923*	*1758*	*3098*	*2122*	*1798*	*2453*
Ca	mg/l												
Conduct.	µS												
Fe tot	mg/l	12700	15000	11400	8220	10600	8000	9160	6030	9950	7179	6250	8090
Fe ++	mg/l												
Fe +++	mg/l												
SD/TDS	mg/l	115000	130000	103000	69700	88000	79200	76000	48000	80000	57000	49000	65000
Mg	mg/l	*4530*	*5288*	*3951*	*2474*	*3262*	*2876*	*2739*	*1614*	*2910*	*1961*	*1652*	*2281*
Mn tot	mg/l												
SO4 =	mg/l	*67940*	*77722*	*60267*	*39687*	*50867*	*45451*	*43500*	*26839*	*45941*	*32114*	*27422*	*36867*
pH													
EH	mV												

Station 511		11/5/92	11/10/92	11/17/92	11/24/92	12/1/92	12/8/92	12/15/92	12/22/92	12/30/92
lab		2	2	2	2	2				
Acidité/Acidity	mg/l	*29832*	*34625*	*36424*	*36004*	*49639*	*41225*	*55660*	*55660*	*71958*
Al	mg/l	*1838*	*2163*	*2286*	*2257*	*3230*	*2622*	*3680*	*3680*	*4960*
Ca	mg/l									
Conduct.	µS									
Fe tot	mg/l	5400	7520	7970	7780	10900	10300	11300	13000	14400
Fe ++	mg/l									
Fe +++	mg/l									
SD/TDS	mg/l	50000	58000	61000	60300	83000	69000	93000	93000	120000
Mg	mg/l	*1690*	*2000*	*2120*	*2092*	*3041*	*2445*	*3487*	*3487*	*4778*
Mn tot	mg/l									
SO4 =	mg/l	*28005*	*32705*	*34483*	*34067*	*47781*	*39266*	*53977*	*53977*	*71177*
pH										
EH	mV									

Station 512		4/9/91	4/15/91	4/22/91	4/29/91	5/7/91	5/13/91	5/20/91	5/27/91	6/3/91	6/10/91	6/16/91	7/3/91
lab		1	1	1	1	1	1	1	1	1	1	1	2
Acidité/Acidity	mg/l	19963	14617	14224	16284	17756	14224	17658	31147	18639	33746	15451	28750
Al	mg/l	949	571	716	682	733	615	766	1379	813	1546	681	1430
Ca	mg/l	361	257	263	247	366	409	412	456	306	479	349	
Cd	mg/l	na	na	na	na								
Conduct.	µS	11473	8862	9575	10567	10301	9612	11679	16092	11522	15862	9660	25500
Cu	mg/l	15	9	10	12								
Fe tot	mg/l	6413	4067	4220	4768	4845	3799	4539	8479	4692	8759	4003	7980
Fe ++	mg/l	99	110	149	162	32	28	38	55	39	115	128	
Fe +++	mg/l	6314	3957	4071	4606	4813	3771	4501	8424	4653	8644	3875	
K	mg/l	0.12	0.25	0.15	0.15	<0,1	<0,1	0.14	<0,1	0.14	<0,1	0.22	
SD/TDS	mg/l	33960	22685	24615	27035	27680	23500	28760	49470	28785	53750	24535	
Mg	mg/l	841	135	714	637	688	586	663	1122	688	1198	535	
Mn tot	mg/l	54	34	38	42	46	40	47	74	48	81	42	
Na	mg/l	6	11	5	5	11	21	15	4	7	3	7	
Ni	mg/l	3	2	2	3								
Pb	mg/l	0.48	0.45	0.45	0.45								
Si	mg/l	33	28	30	31								
SO4 =	mg/l	15917	9654	7564	9938	15719	12345	16336	28928	16336	31356	13291	31000
Zn	mg/l	6	4	5	5								
pH		2.31	2.39	2.39	2.22	2.41	2.4	2.42	2.32	2.41	2.27	2.39	2.13
Eh	mV	520	514	506	511	652	675	645	658	653	569	601	

30 and 7 calc. conduct.

Station 512		7/10/91	7/16/91	7/23/91	7/30/91	8/7/91	8/14/91	8/21/91	8/28/91	9/4/91	9/11/91	9/18/91	9/25/91
lab		2	2	2	2	2	2	2	2	2	2	2	2
Acidité/Acidity	mg/l	20000	*21398*	*35465*	*33508*	*39411*	*26395*	*27522*	*28934*	*22892*	9500	*16083*	*22294*
Al	mg/l	1100	*1287*	*2220*	*2072*	*2512*	1320	*1685*	*1778*	*1383*		*952*	*1344*
Ca	mg/l	410					420				310		
Conduct.	µS	13000	39500	22500	16000	18000	30000	14000	15000	21000	13000	17000	18000
Fe tot	mg/l	5600	*5534*	*9003*	*7718*	*9117*	7200	*7061*	*7409*	*5909*	3500	*4189*	*5759*
Fe ++	mg/l	244					164				2100		
Fe +++	mg/l	5360					7000				1400		
SD/TDS	mg/l	57000	35900	59400	114800	7050	44500	46140	48500	38400	20200	27000	37400
Mg	mg/l	780	*1170*	*2056*	*1858*	*2287*	890	*1544*	*1633*	*1260*	410	*859*	*1224*
Mn tot	mg/l	58					65				35		
SO4 =	mg/l	26500	*19869*	*33533*	*31117*	*37284*	31000	*25759*	*27131*	*21298*	13250	*14830*	*20725*
pH		2.22	2.22	2.04	2.09	2.05	2.11	2.22	2.1	2.12	2.31	2.12	2.12
Eh	mV												

Station 512		10/7/91	10/16/91	10/23/91	10/29/91	11/7/91	11/13/91	11/19/91	11/26/91	12/4/91	12/11/91	12/18/91	12/24/91
lab		2	2	2	2	2	2	2	2	non-disponible	2	2	non-disponible
Acidité/Acidity	mg/l	*18590*	*21756*	*26839*	*16083*	*23131*	*29174*	*24566*	*17694*		*28695*	*26660*	
Al	mg/l	*1109*	*1310*	*1640*	*952*	*1398*	*1794*	*1491*	*1053*		*1762*	*1628*	
Ca	mg/l			400		380							
Conduct.	µS	15000	24000	20000	20000	19000	17000	18000	13000		15000	21000	
Fe tot	mg/l	*4826*	*5624*	6400	*4189*	6900	*7468*	*6327*	*4599*		*7350*	*6847*	
Fe ++	mg/l			200		160							
Fe +++	mg/l			6200		6740							
SD/TDS	mg/l	31200	36500	45000	27000	38800	48900	41200	29700		48100	44700	
Mg	mg/l	*1004*	*1191*	790	*859*	760	*1648*	*1361*	*952*		*1618*	*1490*	
Mn tot	mg/l			61		60							
SO4 =	mg/l	*17198*	*20211*	26500	*14830*	28000	*27364*	*22905*	*16350*		*26898*	*24925*	
pH		2.1	2.13	2.18	2.39	2.08	2.14	2.24	2.39		2.24	2.3	
Eh	mV												

Station 512		12/30/91	1/8/92	1/15/92	1/30/92		3/30/92	4/8/92	4/14/92	4/22/92	4/30/92	5/7/92	5/13/92
lab		gelé/frozen	gelé/frozen	gelé/frozen	gelé/frozen	gelé/frozen	gelé/frozen	2	2	2	2	2	2
Acidité/Acidity	mg/l							*10119*	*22653*	*23012*	*16083*	*23849*	*10119*
Al	mg/l							*588*	*1367*	*1390*	*952*	*1444*	*588*
Ca	mg/l												
Conduct.	µS							9000	13300	22000	9800	13000	7600
Fe tot	mg/l							*2656*	*5849*	*5939*	*4189*	*6148*	*2656*
Fe ++	mg/l												
Fe +++	mg/l												
SD/TDS	mg/l							17000	38000	38600	27000	40000	17000
Mg	mg/l							*526*	*1245*	*1267*	*859*	*1318*	*526*
Mn tot	mg/l												
SO4 =	mg/l							*9257*	*21069*	*21412*	*14830*	*22215*	*9257*
pH								2.34	2.2	2.7	2.3	2.3	2.5
Eh	mV												

Station 512		5/21/92	5/27/92	6/3/92	6/11/92	6/17/92	6/23/92	6/30/92	7/7/92	7/16/92	7/21/92	7/28/92	8/4/92
lab		2	2										
Acidité/Acidity	mg/l	*16083*	*32827*	*52046*	*38824*	*41825*	*25643*	*34026*	*21458*	*28635*	*29234*	*38224*	*34625*
Al	mg/l	*952*	*2040*	*3409*	*2453*	*2665*	*1561*	*2122*	*1291*	*1758*	*1798*	*2411*	*2163*
Ca	mg/l												
Conduct.	µS	15000	21000										
Fe tot	mg/l	*4189*	*8363*	9380	9410	11100	6560	9000	5710	9220	7270	8200	7090
Fe ++	mg/l												
Fe +++	mg/l												
SD/TDS	mg/l	27000	55000	87000	65000	70000	43000	57000	36000	48000	49000	64000	58000
Mg	mg/l	*859*	*1883*	*3217*	*2281*	*2486*	*1428*	*1961*	*1173*	*1614*	*1652*	*2240*	*2000*
Mn tot	mg/l												
SO4 =	mg/l	*14830*	*30935*	*50248*	*36867*	*39868*	*23942*	*32114*	*19926*	*26839*	*27422*	*36269*	*32705*
pH		2.2	2.1										
Eh	mV												

Station 512 lab		8/12/92	8/19/92	8/25/92	9/1/92	9/8/92	9/15/92	9/24/92	9/29/92	10/8/92	10/14/92	10/20/92	10/26/92
Acidité/Acidity	mg/l	*32228*	*35824*	*25463*	*25583*	*30431*	*19665*	*30431*	*14889*	*7140*	*20860*	*22653*	*25045*
Al	mg/l	*1999*	*2245*	*1550*	*1557*	*1878*	*1177*	*1878*	*878*	*411*	*1252*	*1367*	*1522*
Ca	mg/l												
Conduct.	µS												
Fe tot	mg/l	8300	9620	6800	6160	8750	4700	8240	4490	2010	5780	6670	7310
Fe ++	mg/l												
Fe +++	mg/l												
SD/TDS	mg/l	54000	60000	42700	42900	51000	33000	51000	25000	12000	35000	38000	42000
Mg	mg/l	*1844*	*2080*	*1416*	*1424*	*1728*	*1067*	*1728*	*791*	*366*	*1138*	*1245*	*1391*
Mn tot	mg/l												
SO4 =	mg/l	*30347*	*33889*	*23769*	*23885*	*28589*	*18219*	*28589*	*13708*	*6506*	*19356*	*21069*	*23366*
pH													
Eh	mV												

Station 512 lab		11/5/92 2	11/10/92 2	11/17/92 2	11/24/92 2	12/1/92 2	12/8/92	12/15/92	12/22/92	12/30/92 station gelée
Acidité/Acidity	mg/l	*19665*	*16083*	*22055*	*20143*	*35824*	*37024*	*40024*	*24447*	
Al	mg/l	*1177*	*952*	*1329*	*1207*	*2245*	*2328*	*2538*	*1483*	
Ca	mg/l									
Conduct.	µS									
Fe tot	mg/l	4850	4820	6710	5900	10800	12800	11500	9530	
Fe ++	mg/l									
Fe +++	mg/l									
SD/TDS	mg/l	33000	27000	37000	33800	60000	62000	67000	41000	
Mg	mg/l	*1067*	*859*	*1209*	*1095*	*2080*	*2160*	*2363*	*1354*	
Mn tot	mg/l									
SO4 =	mg/l	*18219*	*14830*	*20497*	*18673*	*33889*	*35077*	*38064*	*22790*	
pH										
Eh	mV									

APPENDIX C-2

Chemical data from ditch monitoring stations (special sampling program of 1992)

Station 510

#	Date	pH	Eh	Conductivity (uMHOS)	S.G. (g/cc)	TDS (mg/l)	Acidity (mg/l)	Al (mg/l)	Fe tot (mg/l)	Fe2+/Fe3+	Mg (mg/l)	SO4 (mg/l)
1	13/4/92	2,27	441	23007	1,0635	79940	47798	3095	11936	0,39	2908	45904
2	15/4/92	2,25	443	20033	1,0520	67100	40084	2542	10113	0,36	2367	38124
3	17/4/92	2,25	444	19054	1,0482	60430	36082	2263	9152	0,35	2097	34144
4	18/4/92	2,41	460	10446	1,0214	25870	15408	910	4016	0,22	821	14195
5	19/4/92	2,28	446	17567	1,0433	53290	31803	1971	8113	0,33	1816	29930
6	19/4/92	2,42	465	9491	1,0190	22680	13505	793	3529	0,19	713	12411
7	20/4/92	2,36	454	12163	1,0255	31750	18919	1129	4909	0,26	1023	17510
8	20/4/92	2,39	454	10772	1,0218	25880	15414	911	4018	0,26	821	14201
9	21/4/92	2,32	463	11304	1,0237	29150	17366	1032	4515	0,20	933	16040
10	21/4/92	2,29	464	11594	1,0253	30180	17981	1071	4671	0,19	969	16621
11	21/4/92	2,22	460	14399	1,0333	40910	24393	1480	6284	<0,07	1351	22738
12	21/4/92	2,26	463	12997	1,0292	35510	21165	1272	5475	<0,07	1156	19646
15	22/4/92	2,40	664	9080	1,0210	24730	14728	868	3843	<0,07	782	13556
16	22/4/92	2,38	662	9696	1,0232	27960	16656	988	4334	<0,07	892	15370
17	22/4/92	2,35	662	10990	1,0278	33490	19958	1195	5171	<0,07	1084	18497
18	22/4/92	2,37	662	9297	1,0220	25830	15385	909	4010	<0,07	819	14173
19	22/4/92	2,36	660	9986	1,0242	29330	17474	1039	4542	<0,07	939	16142
20	23/4/92	2,37	668	8620	1,0187	23220	13827	813	3612	<0,07	731	12712
21	23/4/92	2,32	668	8898	1,0203	24170	14394	848	3757	<0,07	763	13243
22	23/4/92	2,29	668	11074	1,0277	33340	19868	1189	5149	<0,07	1079	18412
23	23/4/92	2,26	671	13154	1,0380	43900	26181	1596	6729	<0,07	1461	24462
24	23/4/92	2,24	668	14701	1,0434	52140	31114	1924	7944	<0,07	1772	29256
25	23/4/92	2,23	668	15161	1,0450	54430	32486	2017	8279	<0,07	1860	30600
26	24/4/92	2,26	670	15439	1,0447	55350	33037	2054	8414	<0,07	1896	31141
27	24/4/92	2,22	670	17156	1,0533	64730	38662	2442	9773	<0,07	2270	36705
28	24/4/92	2,19	670	18062	1,0576	69280	41393	2634	10425	<0,07	2457	39434
29	25/4/92	2,22	668	16467	1,0502	60560	36160	2268	9171	<0,07	2102	34222
30	25/4/92	2,21	674	17506	1,0548	66470	39706	2515	10023	<0,07	2341	37747
31	26/4/92	2,20	665	18558	1,0607	73740	44072	2825	11060	<0,07	2643	42128
32	26/4/92	2,23	670	17095	1,0519	63610	37990	2395	9612	<0,07	2224	36037
33	26/4/92	2,21	666	18075	1,0573	69060	41261	2625	10394	<0,07	2447	39302
34	27/4/92	2,21	671	19852	1,0651	78900	47173	3050	11789	<0,07	2863	45268
35	28/4/92	2,23	670	16781	1,0511	61530	36742	2308	9311	<0,07	2141	34798
36	28/4/92	2,20	674	20372	1,0662	78790	47107	3045	11774	<0,07	2858	45201
37	29/4/92	2,14	670	18800		74530	44546	2859	11172	<0,07	2676	42607

Station 510

#	Date	pH	Eh	Conductivity (uMHOS)	S.G. (g/cc)	TDS (mg/l)	Acidity (mg/l)	Al (mg/l)	Fe tot (mg/l)	Fe2+/Fe3+	Mg (mg/l)	SO4 (mg/l)
38	29/4/92	2,13	667	20033	1,0699	84690	50656	3305	12601	<0,07	3115	48822
39	29/4/92	2,11	668	20396	1,0710	84980	50830	3318	12641	<0,07	3128	49000
40	29/4/92	2,09	672	19719	1,0665	80360	48051	3114	11995	<0,07	2926	46161
41	29/4/92	2,13	670	20879	1,0722	86810	51932	3400	12896	<0,07	3209	50131
42	30/4/92	2,10	671	20384	1,0691	83250	49789	3241	12399	<0,07	3052	47935
43	30/4/92	2,16	507	21423	1,0711	85590	51198	3346	12726	<0,07	3155	49377
44	30/4/92	2,15	499	21810	1,0724	87710	52474	3441	13021	<0,07	3249	50688
45	1/5/92	2,13	510	21847	1,0732	93440	55925	3700	13812	<0,07	3507	54252
46	1/5/92	2,12	524	22004	1,0728	88210	52775	3463	13090	<0,07	3271	50997
47	2/5/92	2,16	658	15536	1,0445	52260	31186	1929	7962	<0,07	1777	29327
48	2/5/92	2,27	656	9757	1,0224	26360	15701	928	4091	<0,07	837	14470
49	3/5/92	2,21	668	11909	1,0299	35390	21093	1267	5457	<0,07	1152	19578
50	3/5/92	2,17	668	13601	1,0366	43770	26103	1591	6709	<0,07	1456	24387
51	3/5/92	2,16	661	14145	1,0387	47220	28168	1727	7220	<0,07	1585	26386
52	4/5/92	2,14	670	16999	1,0512	63480	37912	2390	9593	<0,07	2219	35959
53	4/5/92	2,13	659	18365	1,0578	70160	41921	2672	10551	<0,07	2493	39964
54	5/5/92	2,12	667	20154	1,0655	81770	48899	3176	12192	<0,07	2987	47026
55	6/5/92	2,17	538	20384	1,0667	82310	49224	3200	12268	<0,07	3011	47357
56	7/5/92	2,15	481	22040	1,0710	85850	51354	3357	12762	0,12	3166	49537
57	7/5/92	2,16	493	22016	1,0728	88190	52763	3462	13087	0,08	3270	50985
58	8/5/92	2,17	487	22088	1,0712	87750	52498	3442	13026	0,10	3251	50712
59	9/5/92	2,17	482	22499	1,0735	89550	53581	3524	13276	0,11	3331	51829
60	10/5/92	2,17	481	22584	1,0739	88680	53058	3484	13155	0,12	3292	51289
61	10/5/92	2,15	560	21884	1,0740	90740	54298	3577	13440	0,01	3385	52568
62	11/5/92	2,14	574	21755	1,0750	92160	55153	3642	13636	0,01	3449	53453
63	12/5/92	2,13	590	22130	1,0760	92660	55455	3665	13705	<0.01	3472	53765
64	13/5/92	2,17	575	16084	1,0460	53050	31659	1961	8078	0,01	1807	29790
65	13/5/92	2,18	585	15602	1,0420	50580	30180	1861	7715	0,01	1712	28344
66	14/5/92	2,14	594	19465	1,0610	73360	43843	2809	11006	<0.01	2627	41898
67	15/5/92	2,13	590	20931	1,0710	86390	51679	3381	12837	<0.01	3190	49871
68	16/5/92	2,11	595	21017	1,0720	86450	51715	3384	12846	<0.01	3193	49908
69	17/5/92	2,11	605	21627	1,0750	90850	54364	3582	13455	<0.01	3390	52637
70	18/5/92	2,13	605	18695	1,0590	70210	41951	2674	10558	<0.01	2495	39994
71	19/5/92	2,10	611	21231	1,0720	88850	53160	3492	13179	<0.01	3300	51394
72	20/5/92	2,10	618	20771	1,0770	93290	55834	3694	13792	<0.01	3501	54158

Station 510

#	Date	pH	Eh	Conductivity (uMHOS)	S.G. (g/cc)	TDS (mg/l)	Acidity (mg/l)	Al (mg/l)	Fe tot (mg/l)	Fe2+/Fe3+	Mg (mg/l)	SO4 (mg/l)
73	21/5/92	2,24	610	21188	1,0800	97240	58215	3875	14334	<0.01	3682	56632
74	30/5/92	2,24	593	21295	1,0830	99130	59354	3963	14592	<0.01	3769	57821
75	5/6/92	2,24	603	21124	1,0810	98660	59071	3941	14527	<0.01	3748	57525
76	10/6/92	2,22	606	21134	1,0820	97600	58432	3892	14383	<0.01	3698	56859
77	15/6/92	2,23	605	18502	1,0660	78360	46848	3026	11713	<0.01	2840	44938
78	21/6/92	2,25	614	21284	1,0840	102680	61496	4128	15074	<0.01	3936	60064
80	21/6/92	2,24	618	21156	1,0840	103490	61984	4166	15184	<0.01	3974	60578
82	22/6/92	2,23	614	21338	1,0840	105030	62914	4239	15392	<0.01	4047	61555
64	23/6/92	2,24	615	21070	1,0840	100160	59975	4010	14732	<0.01	3817	58471
85	24/6/92	2,13	615	22536	1,0840	104000	62292	4190	15253	<0.01	3998	60901
86	24/6/92	2,14	495	22611	1,0880	104000	62292	4190	15253	0,08	3998	60901
87	25/6/92	2,12	539	22365	1,0850	106500	63801	4308	15590	0,02	4117	62491
88	25/6/92	2,12	516	22665	1,0870	107600	64465	4361	15738	0,04	4170	63192
89	25/6/92	2,10	607	20920	1,0720	88560	52985	3479	13139	<0.01	3287	51214
90	26/6/92	2,13	613	16629	1,0460	56000	33427	2081	8509	<0.01	1922	31524
91	26/6/92	2,10	599	22033	1,1200	101410	60729	4069	14902	<0.01	3876	59261
92	26/6/92	2,16	463	23039	1,0800	104990	62889	4237	15386	0,20	4045	61530
93	27/6/92	2,13	472	23093	1,0880	107000	64103	4332	15657	0,15	4141	62809
94	29/6/92	2,14	471	22986	1,0890	107700	64525	4365	15751	0,16	4175	63256
95	1/7/92	2,15	596	14628	1,0410	47710	28461	1747	7293	<0.01	1603	26671
96	3/7/92	2,20	602	11600	1,0300	33290	19838	1188	5141	<0.01	1077	18383
98	8/7/92	2,22	597	21156	1,0750	99450	59547	3977	14635	<0.01	3784	58023
100	14/7/92	2,24	435	25030	1,0890	108560	65045	4406	15867	0,46	4216	63805
102	16/7/92	2,23	433	24666	1,0890	108690	65123	4413	15884	0,49	4222	63888
104	18/7/92	2,22	432	24302	1,0880	107650	64495	4363	15745	0,51	4172	63224
105	19/7/92	2,22	431	24067	1,0856	103930	62250	4187	15243	0,52	3995	60857
108	28/7/92	2,20	430	24666	1,0890	109100	65371	4432	15939	0,54	4242	64150
110	30/7/92	2,20	430	24666	1,0890	112800	67605	4610	16434	0,54	4422	66523
112	1/8/92	2,22	433	22857	1,0800	97940	58637	3907	14429	0,49	3714	57072
114	3/3/92	2,18	428	24666	1,0880	108990	65304	4427	15925	0,57	4237	64080
116	5/8/92	2,22	431	24067	1,0890	108740	65153	4415	15891	0,52	4225	63920
120	9/8/92	2,24	417	25147	1,0900	105650	63288	4268	15475	0,79	4077	61950
122	11/8/92	2,24	420	25147	1,0880	111810	67007	4562	16302	0,73	4374	65887
124	13/8/92	2,24	424	24784	1,0920	112490	67418	4595	16393	0,64	4407	66324
126	15/8/92	2,24	425	24912	1,0920	112800	67605	4610	16434	0,63	4422	66523

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#	Date	pH	Eh	Conductivity (uMHOS)	S.G. (g/cc)	TDS (mg/l)	Acidity (mg/l)	Al (mg/l)	Fe tot (mg/l)	Fe2+/Fe3+	Mg (mg/l)	SO4 (mg/l)
128	17/8/92	2,22	426	24666	1,0930	111890	67056	4566	16313	0,61	4377	65938
130	19/8/92	2,22	429	24302	1,0780	96030	57485	3819	14168	0,55	3626	55873
132	21/8/92	2,22	426	24420	1,0780	108300	64888	4394	15832	0,61	4204	63639
134	23/8/92	2,22	425	23360	1,0890	108140	64791	4386	15811	0,63	4196	63537
136	25/8/92	2,20	424	24666	1,0890	109140	65395	4434	15945	0,64	4244	64176
138	27/8/92	2,22	426	23820	1,0880	104280	62461	4203	15290	0,61	4011	61079
140	29/8/92	2,24	442	18256	1,0580	70120	41897	2670	10545	0,38	2491	39940
142	31/8/92	2,22	438	20674	1,0690	86050	51474	3366	12790	0,42	3175	49661
144	2/9/92	2,18	432	22611	1,0790	100020	59891	4004	14713	0,51	3811	58383
146	4/9/92	2,50	439	23696	1,0783	100810	60368	4041	14820	0,41	3848	58881
148	6/9/92	2,50	436	24180	1,0794	102640	61471	4126	15069	0,45	3934	60039
150	8/9/92	2,50	438	24059	1,0778	100590	60235	4030	14790	0,42	3838	58742
152	10/9/92	2,58	447	18740	1,0548	70990	42420	2707	10669	0,32	2528	40465
154	12/9/92	2,51	438	24785	1,0812	107020	64115	4333	15660	0,42	4142	62822
156	14/9/92	2,62	488	14145	1,0396	52120	31102	1923	7941	0,09	1771	29245
158	16/9/92	2,64	482	13178	1,0353	46020	27450	1680	7043	0,11	1540	25689
160	18/9/92	2,60	465	15354	1,0433	55920	33379	2078	8497	0,19	1919	31477
162	20/9/92	2,50	441	23938	1,0769	100300	60060	4017	14751	0,39	3824	58559
164	22/9/92	2,50	439	24301	1,0783	100540	60205	4028	14783	0,41	3835	58711
166	25/9/92	2,50	435	24785	1,0796	104330	62491	4206	15297	0,46	4014	61111
168	29/9/92	2,50	433	25873	1,0820	115270	69098	4729	16763	0,49	4543	68114
170	1/10/92	2,32	437	24785	1,0779	106670	63903	4316	15613	0,44	4125	62599
172	3/10/92	2,28	434	25389	1,0811	112250	67273	4583	16361	0,48	4395	66169
174	5/10/92	2,27	436	25147	1,0793	108500	65008	4403	15859	0,45	4213	63767
176	7/10/92	2,29	442	22729	1,0711	103650	62081	4174	15205	0,38	3982	60679
178	9/10/92	2,28	433	24180	1,0715	99960	59855	4001	14705	0,49	3808	58345
180	11/10/92	2,29	433	25510	1,0822	106780	63970	4322	15628	0,49	4131	62669
182	13/10/92	2,29	433	25631	1,0838	107890	64640	4374	15777	0,49	4184	63377
184	15/10/92	2,30	434	24422	1,0752	106960	64079	4330	15652	0,48	4139	62784
186	17/10/92	2,42	445	16201	1,0420	58330	34823	2176	8848	0,34	2013	32900
188	22/10/92	2,31	438	20553	1,0479	82110	49104	3191	12240	0,42	3002	47234
190	24/10/92	2,28	437	22850	1,0671	96030	57485	3819	14168	0,44	3626	55873
192	26/10/92	2,28	436	21278	1,0577	96410	57714	3837	14220	0,45	3643	56111
194	28/10/92	2,28	436	25147	1,0811	102920	61640	4140	15106	0,45	3947	60216
196	30/10/92	2,37	437	17893	1,0464	91350	54666	3605	13525	0,44	3412	52948
197	31/10/92	2,33	440	15838	1,0358	61870	36946	2323	9361	0,40	2154	35000
198	1/11/92	2,29	436	24543	1,0766	100060	59915	4006	14718	0,45	3813	58408

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#	Date	pH	Eh	Conductivity (mMHOS)	S.G. (g/cc)	TDS (mg/l)	Acidity (mg/l)	Al (mg/l)	Fe tot (mg/l)	Fe2+/Fe3+	Mg (mg/l)	SO4 (mg/l)
1	15/4/92	2,41	671	7810	1,0160	18150	10804	630	2833	<0,07	564	9893
2	16/4/92	2,39	508	8076	1,0160	18350	10924	637	2864	<0,07	570	10004
3	17/4/92	2,32	674	8149	1,0170	19450	11579	676	3033	<0,07	606	10613
4	17/4/92	2,27	583	10518	1,0250	28620	17050	1012	4435	<0,07	915	15741
5	18/4/92	2,45	671	5900	1,0100	11880	7069	407	1863	<0,07	363	6440
6	18/4/92	2,39	541	6480	1,0120	13520	8045	465	2117	<0,07	415	7340
7	18/4/92	2,33	675	8245	1,0170	19850	11818	691	3095	<0,07	619	10836
8	18/4/92	2,35	519	7520	1,0150	17390	10351	602	2716	<0,07	539	9472
9	19/4/92	2,46	523	5005	1,0080	9300	5533	317	1461	<0,07	282	5030
10	19/4/92	2,45	672	5235	1,0080	9890	5884	338	1553	<0,07	300	5352
11	19/4/92	2,38	677	6589	1,0120	14220	8462	490	2226	<0,07	437	7724
12	19/4/92	2,37	677	6686	1,0120	14510	8635	500	2271	<0,07	446	7884
13	19/4/92	2,37	677	6782	1,0130	14980	8915	516	2344	<0,07	461	8143
14	19/4/92	2,36	678	6637	1,0120	14460	8605	498	2263	<0,07	445	7856
15	20/4/92	2,33	675	6758	1,0120	14860	8844	512	2325	<0,07	457	8077
16	20/4/92	2,37	672	6420	1,0120	13590	8087	467	2128	<0,07	417	7378
17	20/4/92	2,41	680	5731	1,0100	11630	6920	398	1824	<0,07	355	6303
18	20/4/92	2,44	675	5416	1,0090	11745	6988	402	1842	<0,07	358	6366
19	20/4/92	2,41	677	6263	1,0110	13480	8022	463	2111	<0,07	413	7318
20	20/4/92	2,36	684	7061	1,0140	16210	9648	560	2534	<0,07	501	8821
21	20/4/92	2,40	514	6311	1,0110	13180	7843	453	2065	<0,07	404	7153
22	21/4/92	2,52	629	5235	1,0085	10530	6265	360	1653	<0,07	320	5702
23	21/4/92	2,60	640	4824	1,0092	9240	5497	315	1451	<0,07	280	4998
24	21/4/92	2,59	644	5308	1,0099	11000	6545	376	1726	<0,07	335	5959
25	21/4/92	2,49	648	5852	1,0111	12850	7646	441	2013	<0,07	393	6972
26	21/4/92	2,51	649	5223	1,0102	11210	6670	384	1758	<0,07	342	6073
27	21/4/92	2,53	648	4691	1,0084	8890	5288	303	1397	<0,07	269	4807
28	21/4/92	2,48	632	5501	1,0096	10650	6336	364	1671	<0,07	324	5767
29	21/4/92	2,48	645	5320	1,0095	11420	6795	391	1791	<0,07	348	6188
30	21/4/92	2,50	641	4401	1,0060	8250	4908	281	1297	<0,07	249	4458
31	22/4/92	2,45	634	4014	1,0060	6910	4110	235	1087	<0,07	208	3730
32	22/4/92	2,45	639	5138	1,0080	10490	6241	359	1646	<0,07	319	5680
33	22/4/92	2,40	648	6105	1,0108	12980	7724	446	2034	<0,07	397	7043
34	22/4/92	2,31	658	6807	1,0131	15470	9207	534	2419	<0,07	477	8413
35	22/4/92	2,26	661	7508	1,0148	17930	10673	622	2799	<0,07	557	9771

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#	Date	pH	Eh	Conductivity (mMHOS)	S.G. (g/cc)	TDS (mg/l)	Acidity (mg/l)	Al (mg/l)	Fe tot (mg/l)	Fe2+/Fe3+	Mg (mg/l)	SO4 (mg/l)
36	22/4/92	2,29	657	7048	1,0143	16640	9904	576	2600	<0,07	515	9058
37	23/4/92	2,26	656	7943	1,0155	19920	11859	693	3106	<0,07	622	10874
38	23/4/92	2,29	654	7677	1,0147	19540	11633	680	3047	<0,07	609	10663
40	24/4/92	2,29	658	7943	1,0159	19440	11573	676	3032	<0,07	606	10608
41	25/4/92	2,29	648	8378	1,0168	21070	12545	735	3282	<0,07	660	11514
42	26/4/92	2,34	655	6577	1,0114	14950	8897	515	2339	<0,07	460	8126
43	27/4/92	2,33	658	7314	1,0138	16970	10101	587	2651	<0,07	525	9240
45	29/4/92	2,29	659	9962	1,0215	27510	16387	971	4266	<0,07	877	15116
46	30/4/92	2,36	660	8257	1,0165	20440	12170	712	3186	<0,07	639	11163
47	30/4/92	2,40	656	6105	1,0105	12970	7718	445	2032	<0,07	397	7038
48	1/5/92	2,41	648	4739	1,0068	8500	5056	289	1336	<0,07	257	4594
49	2/5/92	2,43	652	5247	1,0083	9890	5884	338	1553	<0,07	300	5352
50	2/5/92	2,38	651	6940	1,0124	15160	9022	523	2372	<0,07	467	8242
51	3/5/92	2,40	653	6057	1,0148	12650	7527	434	1982	<0,07	387	6862
52	3/5/92	2,35	650	7593	1,0182	18010	10721	625	2812	<0,07	559	9815
53	4/5/92	2,30	668	8971	1,0185	23000	13696	805	3578	<0,07	724	12589
54	6/5/92	2,29	644	10567	1,0254	31530	18787	1121	4876	<0,07	1016	17385
55	9/5/92	2,25	653	13456	1,0355	43980	26229	1600	6740	<0,07	1464	24508
56	12/5/92	2,38	651	7846	1,0162	21020	12515	733	3275	<0,07	658	11486
57	13/5/92	2,36	651	9527	1,0251	26140	15570	920	4058	<0,07	830	14347
58	16/5/92	2,22	562	11728	1,0288	35450	21129	1270	5466	<0,07	1154	19612
59	19/5/92	2,22	590	12766	1,0332	40950	24417	1481	6290	<0,07	1352	22761
60	30/6/92	2,14	599	20899	1,0653	83060	49675	3233	12373	<0,07	3044	47818
62	14/7/92	2,12	469	24302	1,0782	98920	59228	3953	14563	<0,07	3760	57689
64	15/7/92	2,15	495	22023	1,0719	91230	54593	3600	13508	<0,07	3407	52873
66	17/7/92	2,10	460	25147	1,0812	104050	6190	356	1633	<0,07	316	5633
68	19/7/92	2,14	473	22729	1,0773	95760	57323	3807	14131	<0,07	3614	55703
70	21/7/92	2,13	473	24302	1,0840	107160	64199	4340	15679	<0,07	4149	62911
72	22/7/92	2,10	469	24912	1,0891	112400	6688	385	1763	<0,07	342	6090
74	23/7/92	2,13	480	21884	1,0723	91440	54720	3609	13537	<0,07	3417	53004
76	25/7/92	2,15	487	22130	1,0736	93990	56256	3726	13888	<0,07	3532	54595
78	29/7/92	2,14	477	24067	1,0787	101970	61067	4095	14978	<0,07	3902	59615
80	1/8/92	2,16	531	19829	1,0630	76830	45929	2959	11498	<0,07	2774	44005
82	3/8/92	2,13	465	21884	1,0648	81680	48845	3172	12180	<0,07	2983	46970
84	5/8/92	2,14	469	22857	1,0767	96190	57582	3827	14190	<0,07	3633	55973

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#	Date	pH	Eh	Conductivity (mMHOS)	S.G. (g/cc)	TDS (mg/l)	Acidity (mg/l)	Al (mg/l)	Fe tot (mg/l)	Fe2+/Fe3+	Mg (mg/l)	SO4 (mg/l)
86	7/8/92	2,14	470	24302	1,0850	106840	64006	4325	15636	<0,07	4133	62707
88	8/8/92	2,13	476	23703	1,0821	105550	63227	4263	15462	<0,07	4072	61886
90	9/8/92	2,10	463	25276	1,0895	115550	69267	4743	16800	<0,07	4557	68295
92	10/8/92	2,11	480	23210	1,0823	105280	63064	4251	15426	<0,07	4059	61714
94	11/8/92	2,11	461	25993	1,0899	115210	69062	4726	16755	<0,07	4540	68075
96	13/8/92	2,11	465	27930	1,0991	118620	71123	4893	17206	<0,07	4709	70281
98	15/8/92	2,08	454	27694	1,0980	124840	74886	5200	18023	<0,07	5023	74333
100	18/8/92	2,12	491	20557	1,0657	84390	50475	3292	12559	<0,07	3102	48637
102	20/8/92	2,12	473	21402	1,0699	89080	53298	3502	13211	<0,07	3310	51537
104	22/8/92	2,11	467	23210	1,0788	98750	59125	3945	14540	<0,07	3752	57582
106	24/8/92	2,18	473	18737	1,0576	71150	42516	2714	10692	<0,07	2534	40561
108	26/8/92	2,14	482	20674	1,0658	83300	49820	3244	12406	<0,07	3054	47966
110	28/8/92	2,16	558	14992	1,0412	50470	30114	1857	7699	<0,07	1708	28279
112	31/8/92	2,13	495	18737	1,0558	71270	42588	2719	10709	<0,07	2539	40634
113	1/9/92	2,09	432	24180	1,0855	109790	65787	4465	16032	<0,07	4275	64592
114	3/9/92	2,61	631	17289	1,0524	68180	40732	2588	10268	<0,07	2411	38773
116	6/9/92	2,34	511	19586	1,0619	79300	47414	3067	11846	<0,07	2880	45513
118	8/9/92	2,34	493	20311	1,0651	82100	49098	3190	12239	0,08	3002	47228
120	10/9/92	2,32	648	18256	1,0559	70380	42053	2681	10582	<0,07	2502	40097
122	12/9/92	2,37	634	12090	1,0280	38173	22756	1374	5875	<0,07	1251	21167
124	14/9/92	2,45	639	10881	1,0265	31880	18996	1134	4928	<0,07	1028	17583
126	16/9/92	2,51	639	6891	1,0131	16500	9821	571	2579	<0,07	510	8981
128	18/9/92	2,56	635	5561	1,0098	12750	7587	438	1998	<0,07	390	6917
130	20/9/92	2,34	661	17410	1,0524	67120	40096	2543	10116	<0,07	2367	38136
132	22/9/92	2,34	663	17289	1,0525	66500	39724	2517	10027	<0,07	2342	37765
134	24/9/92	2,33	541	19344	1,0620	78530	46951	3033	11737	<0,07	2847	45042
136	26/9/92	2,33	519	19949	1,0642	80820	48328	3134	12059	<0,07	2946	46443
138	28/9/92	2,35	647	20190	1,0642	89470	53533	3520	13265	<0,07	3328	51779
140	30/9/92	2,35	498	20795	1,0629	92060	55093	3637	13622	<0,07	3445	53390
142	2/10/92	2,31	639	14024	1,0372	47511	28342	1739	7263	<0,07	1596	26555
144	4/10/92	2,34	653	19465	1,0606	80730	48274	3130	12047	<0,07	2942	46388
146	6/10/92	2,35	642	20674	1,0680	85590	51198	3346	12726	<0,07	3155	49377
148	8/10/92	2,36	650	17410	1,0511	63040	37648	2371	9529	<0,07	2201	35697
150	10/10/92	2,35	491	21158	1,0683	94030	56280	3727	13894	0,09	3534	54620
152	12/10/92	2,51	504	14629	1,0451	50564	30170	1861	7713	<0,07	1712	28334
154	14/10/92	2,43	511	17772	1,0530	70050	41855	2667	10535	<0,07	2488	39898

Station 511

#	Date	pH	Eh	Conductivity (mMHOS)	S.G. (g/cc)	TDS (mg/l)	Acidity (mg/l)	Al (mg/l)	Fe tot (mg/l)	Fe2+/Fe3+	Mg (mg/l)	SO4 (mg/l)
156	16/10/92	2,41	544	16201	1,0493	68940	41189	2620	10377	<0,07	2442	39230
158	18/10/92	2,44	630	10035	1,0248	33480	19952	1195	5170	<0,07	1084	18491
160	24/10/92	2,41	636	14387	1,0405	49870	29754	1833	7611	<0,07	1685	27929
162	26/10/92	2,39	646	15596	1,0464	61740	36868	2317	9342	<0,07	2149	34923
164	28/10/92	2,40	518	16563	1,0496	63040	37648	2371	9529	<0,07	2201	35697
166	29/10/92	2,40	638	16442	1,0497	61390	36658	2303	9291	<0,07	2135	34715
168	5/11/92	2,43	644	13783	1,0366	45340	27043	1653	6942	<0,07	1514	25295
169	9/11/92	2,40	503	17651	1,0519	64200	38344	2420	9697	<0,07	2248	36389
170	10/11/92	2,42	650	13299	1,0358	43580	25990	1584	6681	<0,07	1449	24277
171	11/11/92	2,45	504	9068	1,0242	24996	14887	878	3883	<0,07	791	13705

Station 512

#	Date	pH	Eh	Conductivity (mMHOS)	S.G. (g/cc)	TDS (mg/l)	Acidity (mg/l)	Al (mg/l)	Fe tot (mg/l)	Fe2+/Fe3+	Mg (mg/l)	SO4 (mg/l)
1	13/4/92	2,36	534	6238	1,0106	12980	7724	446	2034	<0,07	397	7043
2	16/4/92	2,30	663	5839	1,0101	12130	7218	416	1902	<0,07	370	6577
3	18/4/92	2,06	550	9745	1,0205	26270	15647	925	4077	<0,07	834	14420
4	19/4/92	2,09	662	8681	1,0169	22070	13142	771	3436	<0,07	693	12070
5	20/4/92	2,17	665	6819	1,0118	15230	9064	525	2382	<0,07	469	8280
6	21/4/92	2,27	556	6142	1,0103	12880	7664	442	2018	<0,07	394	6988
7	21/4/92	2,27	671	5779	1,0093	11640	6926	399	1825	<0,07	355	6309
8	22/4/92	2,44	641	5670	1,0107	13060	7771	449	2046	<0,07	400	7087
9	22/4/92	2,32	656	8076	1,0186	22120	13171	773	3443	<0,07	695	12098
12	22/4/92	2,30	664	11207	1,0310	37290	22229	1340	5743	<0,07	1220	20662
13	22/4/92	2,25	662	10857	1,0297	27680	16489	977	4292	<0,07	882	15212
14	23/4/92	2,30	660	10397	1,0281	25350	15098	891	3937	<0,07	803	13904
15	23/4/92	2,28	660	11353	1,0318	38790	23125	1398	5967	<0,07	1274	21521
16	23/4/92	2,20	646	12815	1,0349	42420	25296	1539	6509	<0,07	1406	23608
17	23/4/92	2,17	653	13214	1,0421	44150	26331	1606	6766	<0,07	1470	24607
18	23/4/92	2,16	656	13009	1,0368	43200	25762	1569	6625	<0,07	1435	24058
19	23/4/92	2,24	659	12247	1,0327	39670	23651	1432	6099	<0,07	1306	22026
20	24/4/92	2,17	663	12827	1,0346	42020	25057	1523	6449	<0,07	1391	23377
21	25/4/92	2,21	661	10530	1,0261	31130	18548	1106	4815	<0,07	1002	17159
22	26/4/92	2,24	648	10228	1,0256	29900	17814	1060	4629	<0,07	959	16463
23	27/4/92	2,26	656	9394	1,0215	25740	15331	906	3997	<0,07	816	14122
24	29/4/92	2,22	664	10144	1,0242	28860	17193	1021	4471	<0,07	923	15877
25	30/4/92	2,40	652	5404	1,0092	10900	6485	373	1710	<0,07	332	5904
29	4/5/92	2,18	660	12017	1,0310	37820	22545	1360	5822	<0,07	1239	20966
30	7/5/92	2,17	670	11872	1,0299	36750	21906	1319	5662	<0,07	1200	20354
31	13/5/92	2,37	666	8040	1,0175	21100	12563	736	3287	<0,07	661	11530
32	17/5/92	2,22	574	9539	1,0210	25680	15295	903	3987	<0,07	814	14089
34	25/5/92	2,07	616	13175	1,0360	44490	26534	1620	6816	<0,07	1483	24803
36	7/7/92	2,07	625	13635	1,0390	45360	27055	1654	6945	<0,07	1515	25307
38	14/7/92	2,04	630	14063	1,0410	49690	29647	1826	7584	<0,07	1678	27824
40	16/7/92	2,05	627	14138	1,0410	50460	30108	1857	7698	<0,07	1708	28274
41	17/7/92	2,02	522	14694	1,0420	51880	30958	1914	7906	<0,07	1762	29104
42	18/7/92	2,01	613	14512	1,0430	53580	31976	1982	8155	<0,07	1828	30101
44	20/7/92	2,02	628	14544	1,0430	52480	31318	1938	7994	<0,07	1785	29455
46	22/7/92	2,01	632	15100	1,0450	55510	33133	2061	8437	<0,07	1903	31236

Station 512

#	Date	pH	Eh	Conductivity (mMHOS)	S.G. (g/cc)	TDS (mg/l)	Acidity (mg/l)	Al (mg/l)	Fe tot (mg/l)	Fe2+/Fe3+	Mg (mg/l)	SO4 (mg/l)
48	23/7/92	2,01	636	14983	1,0450	55200	32947	2048	8392	<0,07	1890	31053
50	25/7/92	2,03	631	14256	1,0410	51190	30545	1886	7805	<0,07	1735	28700
52	27/7/92	2,01	635	14576	1,0430	51700	30850	1906	7880	<0,07	1755	28999
54	30/7/92	2,01	638	14748	1,0450	54930	32785	2037	8353	<0,07	1880	30894
56	2/8/92	2,07	635	11935	1,0310	37580	22402	1351	5786	<0,07	1230	20828
58	4/8/92	2,02	640	13560	1,0370	45020	26851	1641	6895	<0,07	1502	25110
60	5/8/92	2,02	640	13774	1,0390	47420	28288	1735	7250	<0,07	1592	26502
62	7/8/92	2,01	642	14042	1,0410	49650	29623	1824	7579	<0,07	1677	27801
64	8/8/92	2,02	504	14502	1,0410	51290	30605	1890	7820	<0,07	1739	28759
66	10/8/92	2,01	621	14042	1,0430	52950	31599	1957	8063	<0,07	1803	29731
68	11/8/92	1,98	635	15100	1,0440	53880	32156	1995	8199	<0,07	1839	30277
70	13/8/92	2,01	632	15186	1,0450	55320	33019	2053	8409	<0,07	1895	31124
72	15/8/92	1,99	514	15742	1,0460	56750	33876	2111	8618	<0,07	1951	31966
74	17/8/92	2,00	616	15646	1,0470	58620	34997	2188	8890	<0,07	2025	33072
76	19/8/92	2,04	622	12726	1,0340	41230	24584	1492	6331	<0,07	1362	22922
78	21/8/92	2,00	629	12833	1,0340	42080	25093	1525	6458	<0,07	1394	23412
82	25/8/92	2,24	624	6898	1,0130	15920	9475	550	2489	<0,07	491	8661
84	26/8/92	2,04	515	12865	1,0330	39370	23472	1420	6054	<0,07	1295	21854
86	28/8/92	2,02	614	10256	1,0240	28910	17223	1023	4479	<0,07	925	15905
88	30/8/92	2,03	625	11475	1,0290	35610	21225	1276	5490	<0,07	1160	19703
92	5/9/92	2,17	637	11667	1,0345	46920	27988	1716	7176	<0,07	1573	26212
94	7/9/92	2,13	641	12779	1,0394	53990	32222	1999	8215	<0,07	1843	30341
96	9/9/92	2,18	657	12682	1,0393	51630	30808	1904	7869	<0,07	1752	28958
98	11/9/92	2,15	652	12574	1,0386	50260	29988	1849	7668	<0,07	1700	28157
100	13/9/92	2,13	655	13239	1,0423	55170	32929	2047	8388	<0,07	1889	31035
102	15/9/92	2,15	638	12308	1,0377	47970	28617	1757	7331	<0,07	1613	26822
104	17/9/92	2,22	661	8572	1,0204	23014	13705	806	3580	<0,07	724	12597
106	19/9/92	2,25	661	5694	1,0110	12637	7519	434	1980	<0,07	387	6855
108	21/9/92	2,16	651	11159	1,0325	42610	25410	1546	6537	<0,07	1413	23717
110	23/9/92	2,16	655	10518	1,0283	31094	18527	1105	4810	<0,07	1000	17138
112	25/9/92	2,13	648	13408	1,0428	56620	33798	2106	8599	<0,07	1946	31890
114	27/9/92	2,28	651	7012	1,0159	28290	16853	1000	4385	<0,07	903	15555
116	29/9/92	2,29	651	7883	1,0194	27090	16136	955	4202	<0,07	862	14880
118	1/10/92	2,40	643	5428	1,0124	15080	8975	520	2359	<0,07	464	8198
120	3/10/92	2,30	645	5187	1,0092	11024	6559	377	1730	<0,07	336	5972

Station 512

#	Date	pH	Eh	Conductivity (mMHOS)	S.G. (g/cc)	TDS (mg/l)	Acidity (mg/l)	Al (mg/l)	Fe tot (mg/l)	Fe2+/Fe3+	Mg (mg/l)	SO4 (mg/l)
122	5/10/92	2,12	648	12924	1,0400	54570	32570	2023	8300	<0,07	1866	30682
124	7/10/92	2,18	654	9672	1,0253	27484	16372	970	4262	<0,07	876	15102
126	9/10/92	2,44	651	4763	1,0102	12590	7492	432	1973	<0,07	385	6829
128	15/10/92	2,21	666	10941	1,0314	39790	23723	1436	6117	<0,07	1310	22095
130	17/10/92	2,41	635	3990	1,0078	8410	5003	286	1322	<0,07	254	4545
132	19/10/92	2,23	647	9346	1,0234	28740	17121	1017	4453	<0,07	919	15809
134	21/10/92	2,13	644	11534	1,0339	43050	25673	1563	6602	<0,07	1429	23971
136	23/10/92	2,18	653	9491	1,0256	31990	19062	1138	4945	<0,07	1032	17646
138	25/10/92	2,20	657	8765	1,0235	28120	16751	994	4359	<0,07	898	15460
140	27/10/92	2,13	650	11461	1,0341	45180	26947	1647	6918	<0,07	1508	25203
142	29/10/92	2,15	662	9599	1,0274	27182	16191	959	4216	<0,07	865	14932
144	30/10/92	2,29	659	6976	1,0171	22030	13118	770	3430	<0,07	692	12048
146	1/11/92	2,26	651	7943	1,0208	27850	16590	984	4318	<0,07	888	15308
148	3/11/92	2,26	658	8137	1,0198	26980	16071	951	4185	<0,07	859	14818
150	5/11/92	2,24	660	8052	1,0216	32670	19468	1164	5048	<0,07	1056	18031
152	7/11/92	2,33	650	8064	1,0288	28100	16739	993	4356	<0,07	897	15448
153	8/11/92	2,22	660	10289	1,0291	36340	21661	1304	5600	<0,07	1186	20120
154	9/11/92	2,50	645	3748	1,0072	7910	4705	269	1244	<0,07	239	4273
155	10/11/92	2,45	651	4244	1,0093	13830	8230	476	2165	<0,07	424	7510
156	11/11/92	2,34	632	7169	1,0178	21700	12921	758	3379	<0,07	681	11864
157	12/11/92	2,27	660	7641	1,0198	28780	17145	1018	4459	<0,07	920	15831
158	13/11/92	2,26	636	8971	1,0236	29290	17450	1037	4536	<0,07	938	16119

APPENDIX D

Chemical data from lysimeters

Lysimètre / Lysimeter T92-1

T92-1 L3A (1,67m)		11/8/92	29/9/92	5/1/93	4/4/93	7/7/93
Acidité/Acidity	mg/l CaCO3	*386*	6	9	8	*131*
Al	mg/l	*10*	2,13	1,49		*2*
Conduct.	µS	1820	1990	1960	1242	2157
Fe tot	mg/l	*98*	3,28	1,97	0	*32*
Fe ++	mg/l		0,32	1,5	0	
Fe +++	mg/l		2,96	0,47	0	
SD/TDS	mg/l	2680	2500	2200	1060	1180
Mg	mg/l		21,5	11,7	4,9	
SO4 =	mg/l	*1168*	1400	1479	629	*514*
pH		6,91			6,81 7.06	
EH	mV	351			249	315
Densité/SG	g/cc	1,003			1,001	1

T92-1 L3B (1,66m)		11/8/92	29/9/92	5/1/93	4/4/93	7/7/93
Acidité/Acidity	mg/l CaCO3	*274*	6	8	9	*111*
Al	mg/l	*7*	1,92	0,43		*2*
Conduct.	µS	1820	1940	2040	1470	2304
Fe tot	mg/l	*69*	3,78	0,63	0	*27*
Fe ++	mg/l		0,38	0,4	0	
Fe +++	mg/l		3,42	0,23	0	
SD/TDS	mg/l	2090	2600	2400	1690	1030
Mg	mg/l		26,4	18,1	9,1	
SO4 =	mg/l	*911*	1300	1525	827	*449*
pH		6,93			6,94	7,32
EH	mV	344			240	294
Densité/SG	g/cc	1,002			1,001	1

T92-1 L4A (2,42m)		11/8/92	29/9/92	5/1/93	4/4/93	7/7/93
Acidité/Acidity	mg/l CaCO3	*380*	8	7	7	*207*
Al	mg/l	*10*	1,95	0,75		*4*
Conduct.	µS	1820	1890	1960	1625	2951
Fe tot	mg/l	*96*	4,79	1,16	0	*52*
Fe ++	mg/l		0,42	0,6	0	
Fe +++	mg/l		4,37	0,56	0	
SD/TDS	mg/l	2650	2600	2100	1550	1690
Mg	mg/l		29	18,2	11,1	
SO4 =	mg/l	*1155*	1400	1433	994	*736*
pH		6,89			6,81	7,02
EH	mV	359			250	288
Densité/SG	g/cc	1,002			1,001	1

Les valeurs soulignées sont calculées / Underlined values are calculated

Lysimètre / Lysimeter T92-1

T92-1 L4B (2,55m)		11/8/92	29/9/92	5/1/93	4/4/93	7/7/93
Acidité/Acidity	mg/l CaCO3	*382*	8	7	9	*246*
Al	mg/l	*10*	0,89	3,41		*6*
Conduct.	µS	1820	2020	2200	1708	2815
Fe tot	mg/l	*97*	1,52	5,21	0	*62*
Fe ++	mg/l		0,22	3	0	
Fe +++	mg/l		1,3	2,21	0	
SD/TDS	mg/l	2660	2800	2400	1700	1930
Mg	mg/l		32,3	20,4	8,1	
SO4 =	mg/l	*1159*	1400	1602	946	*841*
pH		6,95			7,08	7,31
EH	mV	355			237	297
Densité/SG	g/cc	1,002			1,001	1

T92-1 L5A (4,05m)		11/8/92	29/9/92	5/1/93	4/4/93	7/7/93
Acidité/Acidity	mg/l CaCO3	*446*	7	7	11	*348*
Al	mg/l	*12*	5,69	0,35		*9*
Conduct.	µS	2070	2020	2390	2315	3916
Fe tot	mg/l	*113*	8,99	0,58	0	*88*
Fe ++	mg/l		1,3	0,3	0	
Fe +++	mg/l		7,69	0,28	0	
SD/TDS	mg/l	2970	2800	3100	2400	2490
Mg	mg/l		36,3	50,9	35,3	
SO4 =	mg/l	*1294*	1400	1740	1495	*1085*
pH		6,6			6,97	6,98
EH	mV	368			226	277
Densité/SG	g/cc	1,002			1,002	1

T92-1 L5B (3,75m)		11/8/92	29/9/92	5/1/93	4/4/93	7/7/93
Acidité/Acidity	mg/l CaCO3	*483*	6	8	7	*362*
Al	mg/l	*14*	0,91	1,09		*9*
Conduct.	µS	2230	2340	2490	2401	3383
Fe tot	mg/l	*123*	3,75	1,66	0	*91*
Fe ++	mg/l		0,34	0,8	0	
Fe +++	mg/l		3,41	0,86	0	
SD/TDS	mg/l	3140	3200	3200	2510	2560
Mg	mg/l		97,3	78,9	55,5	
SO4 =	mg/l	*1368*	1500	1847	1535	*1115*
pH		6,63			7,13	7,18
EH	mV	363			252	301
Densité/SG	g/cc	1,004			1,002	1

Les valeurs soulignées sont calculées / Underlined values are calculated

Lysimètre/Lysimeter T92-2

T92-2 L3A (1,67m)		11/8/92	29/9/92	5/1/93	4/4/93	7/7/93
Acidité/Acidity	mg/l CaCO3	*1346*		35030	61459	*41151*
Al	mg/l	*49*		1430	2324	*2498*
Conduct.	µS	15880		32000	21185	18616
Fe tot	mg/l	*351*		12100	16614	*9965*
Fe ++	mg/l			700	11400	
Fe +++	mg/l			11400	5214	
SD/TDS	mg/l	6140		65000	96290	66070
Mg	mg/l			1130	1677	
SO4 =	mg/l	*2675*		45000	63029	*37507*
pH		2,02			1,77	2,09
EH	mV	458			514	480
Densité/SG	g/cc	1,049			1,076	1,0505

T92-2 L3B (1,21m)		11/8/92	29/9/92	5/1/93	4/4/93	7/7/93
Acidité/Acidity	mg/l CaCO3	*242*	8624	7718	8766	*4126*
Al	mg/l	*6*	600	520	557	*179*
Conduct.	µS	7610	11000	16000	8998	8547
Fe tot	mg/l	*61*	1950	1760	1454	*1097*
Fe ++	mg/l		280	180	900	
Fe +++	mg/l		1670	1580	554	
SD/TDS	mg/l	1906	20000	22000	18450	11940
Mg	mg/l		610	530	485	
SO4 =	mg/l	*830*	12000	14325	10875	*5202*
pH		2,25			2,11	2,27
EH	mV	560			662	554
Densité/SG	g/cc	1,015			1,016	1,007

T92-2 L4A (2,54m)		11/8/92	29/9/92	5/1/93	4/4/93	7/7/93
Acidité/Acidity	mg/l CaCO3	*627*	24400	22850	29220	*26799*
Al	mg/l	*19*	2690	2170	2412	*1589*
Conduct.	µS	12410	24000	43000	17588	16380
Fe tot	mg/l	*161*	4780	4670	2878	*6699*
Fe ++	mg/l		2200	2650	1933	
Fe +++	mg/l		2380	2020	945	
SD/TDS	mg/l	3750	54000	48000	43210	43700
Mg	mg/l		1840	1530	1555	
SO4 =	mg/l	*1634*	23000	31500	28832	*24346*
pH		2,17			2,03	2,18
EH	mV	425			484	499
Densité/SG	g/cc	1,031			1,037	1,033

Les valeurs soulignées sont calculées / Underlined values are calculated

Lysimètre/Lysimeter T92-2

T92-2 L4B (2,36m)		11/8/92	29/9/92	5/1/93	4/4/93	7/7/93
Acidité/Acidity	mg/l CaCO3	*2974*	45100	40170	58440	*53746*
Al	mg/l	*124*	2480	1600	2501	*3327*
Conduct.	µS	19350	30000	36000	22334	24405
Fe tot	mg/l	*787*	14200	12900	14342	*12667*
Fe ++	mg/l		4700	2000	11400	
Fe +++	mg/l		9500	10900	2942	
SD/TDS	mg/l	9886	91000	75000	91670	85170
Mg	mg/l		2600	1550	2096	
SO4 =	mg/l	*4307*	42000	50000	59004	*49118*
pH		1,93			1,73	2,06
EH	mV	462			499	465
Densité/SG	g/cc	1,077			1,074	1,065

2 L5A (4,07m)		11/8/92	29/9/92	5/1/93	4/4/93	7/7/93
Acidité/Acidity	mg/l CaCO3	*3194*	33500	29740	36525	*43423*
Al	mg/l	*134*	3530	2450	2634	*2646*
Conduct.	µS	22160	30000	35000	22532	26789
Fe tot	mg/l	*846*	6910	7590	7888	*10464*
Fe ++	mg/l		4300	5000	4800	
Fe +++	mg/l		2610	2590	3088	
SD/TDS	mg/l	10306	78000	59000	64210	69550
Mg	mg/l		3500	2130	1868	
SO4 =	mg/l	*4490*	39000	40000	40750	*39597*
pH		2,15			1,9	2,03
EH	mV	413			432	426
Densité/SG	g/cc	1,031			1,053	1,0545

T92-2 L5B (3,93m)		11/8/92	29/9/92	5/1/93	4/4/93	7/7/93
Acidité/Acidity	mg/l CaCO3	*1182*	21800	16968	17288	*14743*
Al	mg/l	*42*	1790	1260	1079	*855*
Conduct.	µS	16950	25000	32000	17588	15018
Fe tot	mg/l	*307*	5480	4370	3151	*3788*
Fe ++	mg/l		5000	3800	2733	
Fe +++	mg/l		480	570	418	
SD/TDS	mg/l	5660	51000	36000	32050	24370
Mg	mg/l		1880	1200	727	
SO4 =	mg/l	*2466*	28000	24272	19800	*13355*
pH		1,84			1,67	2,2
EH	mV	433			438	434
Densité/SG	g/cc	1,046			1,026	1,0185

Les valeurs soulignées sont calculées / Underlined values are calculated

APPENDIX E-1

Chemical data from leaching of drill samples

Forage/Borehole 1 **Lixiviation/Leaching**

Echantillon Sample	Prof. Depth (m)	pH	Eh (mV)	Conduct. (uS)	Densité S.G. (g/cc)	S.D. TDS (mg/l)	Acidité Calc. Calc. Acidity (mg/l)*	SO4 calc. (mg/l)	Fe calc. (mg/l)	Acidité Acidity (kg/T)**	Acidité Acidity (mg/l)***
1.1	1,5	3,46	344	2 020	1,0022	2 260	305	985	77	0,61	10 689
1.2	3,0	2,34	508	4 190		6 630	1 524	2 889	398	3,05	53 490
1.3	5,0	2,32	478	5 880		11 560	3 899	5 037	1 036	7,80	136 798
1.4	6,1	2,37	502	6 770	1,0106	11 640	3 946	5 072	1 049	7,89	138 456
1.5	7,6	2,51	469	6 660	1,0138	11 420	3 817	4 976	1 014	7,63	133 920
1.6	9,1	2,53	457	6 850		12 250	4 315	5 337	1 148	8,63	151 420
1.7	10,7	2,53	456	6 750	1,0113	12 000	4 162	5 228	1 107	8,32	146 038
1.8	12,2	2,55	454	6 450		12 150	4 254	5 294	1 132	8,51	149 256
1.9	13,7	3,23	394	6 080	1,0095	10 750	3 436	4 684	911	6,87	120 561
1.10	15,2	3,66	354	3 250	1,0038	4 040	701	1 760	180	1,40	24 602
1.11	16,8	3,71	421	3 300	1,0034	3 680	610	1 603	156	1,22	21 397
1.12	18,3	3,35	376	5 260	1,0095	7 970	2 065	3 473	543	4,13	72 459
1.13	19,8	3,40	386	4 580		6 460	1 461	2 815	382	2,92	51 280
1.14	21,3	3,38	389	4 230	1,0082	5 610	1 165	2 444	303	2,33	40 890
1.15	22,8	7,00	278	903	1,0005	850	88	370	22	0,18	3 105
									Moy/Mean	4,77	83 624

*: *Acid: mg/l eq. CaCO3*

**: *Acid: eq. kg CaCO3/T de roche/ of rock*

***: *Acid. sur une base de 5,7% de teneur en eau*

***: *Acid. basis of a 5,7% water content*

Forage/Borehole 2 **Lixiviation/Leaching**

Echantillon Sample	Prof. Depth (m)	pH	Eh (mV)	Conduct. (uS)	Densité S.G. (g/cc)	S.D. TDS (mg/l)	Acidité Calc. Calc. Acidity (mg/l)*	SO4 calc. (mg/l)	Fe calc. (mg/l)	Acidité Acidity (kg/T)**	Acidité Acidity (mg/l)***
2.1	1,5	6,92	254	591	0,9996	500	48	218	12	0,10	1 693
2.2	3,0	6,87	179	1 259	1,0015	1 350	155	588	38	0,31	5 447
2.3	5,0	6,72	231	2 040	1,0023	2 450	340	1 067	86	0,68	11 944
2.4	9,1	6,41	213	2 120	1,0036	2 600	370	1 133	94	0,74	12 973
2.5	10,7	6,70	368	2 580	1,0037	2 970	446	1 294	113	0,89	15 658
2.6	16,8	6,62	404	2 410	1,0034	2 770	404	1 207	102	0,81	14 181
2.7	18,3	2,78	445	7 260	1,0120	13 570	5 170	5 912	1 379	10,34	181 418
2.8	19,8	2,73	455	5 680	1,0081	9 810	2 935	4 274	776	5,87	102 975
2.9	21,3	3,10	410	5 160	1,0065	7 640	1 925	3 329	505	3,85	67 533
2.10	22,9	3,21	402	3 420	1,0037	4 890	939	2 131	243	1,88	32 953
2.11	25,0	3,14	404	4 190	1,0053	6 090	1 329	2 653	346	2,66	46 621
2.12	26,2	3,23	399	4 080	1,0043	5 880	1 256	2 562	327	2,51	44 071
2.13	27,4	4,22	336	3 650	1,0066	4 370	790	1 904	204	1,58	27 713
2.14	28,9	4,13	322	2 990	1,0062	3 490	564	1 521	144	1,13	19 786
2.15	30,5	5,57	226	2 410	1,0038						
									Moy/Mean	2,38	41 783

*: *Acid: mg/l eq. CaCO3*

**: *Acid: eq. kg CaCO3/T de roche/ of rock*

***: *Acid. sur une base de 5,7% de teneur en eau*

***: *Acid. basis of a 5,7% water content*

Forage/Borehole 5 **Lixiviation/Leaching**

Echantillon Sample	Prof. Depth (m)	pH	Eh (mV)	Conduct. (uS)	Densité S.G. (g/cc)	S.D. TDS (mg/l)	Acidité Calc. Calc. Acidity (mg/l)*	SO4 calc. (mg/l)	Fe calc. (mg/l)	Acidité Acidity (kg/T)**	Acidité Acidity (mg/l)***
5.1	1,5	3,40	438	2 683		2 940	440	1 281	112	0,88	15 433
5.2	3,0	2,36	504	8 523		21 510	11 914	9 372	3 209	23,83	418 028
5.3	4,6	2,36	495	6 915		13 750	5 293	5 991	1 413	10,59	185 715
5.4	6,1	2,46	496	8 148		17 560	8 216	7 651	2 205	16,43	288 280
5.5	7,6	2,75	441	4 255		5 950	1 280	2 592	333	2,56	44 913
5.6	9,1	2,50	460	4 933		6 950	1 646	3 028	431	3,29	57 771
5.7	10,7	2,90	426	3 990		5 620	1 169	2 449	304	2,34	41 006
5.8	12,2	2,76	433	4 497		6 260	1 389	2 727	362	2,78	48 736
5.9	13,7	2,71	440	6 323		10 450	3 272	4 553	867	6,54	114 802
5.10	15,2	3,33	379	5 090		8 050	2 100	3 507	552	4,20	73 678
5.11	16,8	3,38	367	5 658		9 290	2 674	4 048	706	5,35	93 827
5.12	18,3	6,16	274	3 893		4 290	768	1 869	198	1,54	26 943
5.13	19,8	3,61	365	3 941		5 000	972	2 179	252	1,94	34 114
5.14	21,2	3,78	358	3 409		4 310	773	1 878	199	1,55	27 135
									Moy/Mean	5,99	105 027

*: *Acid: mg/l eq. CaCO3*

**: *Acid: eq. kg CaCO3/T de roche/ of rock*

***: *Acid. sur une base de 5,7% de teneur en eau*

***: *Acid. basis of a 5,7% water content*

Forage/Borehole 6 **Lixiviation/Leaching**

Echantillon Sample	Prof. Depth (m)	pH	Eh (mV)	Conduct. (uS)	Densité S.G. (g/cc)	S.D. TDS (mg/l)	Acidité Calc. Calc. Acidity (mg/l)*	SO4 calc. (mg/l)	Fe calc. (mg/l)	Acidité Acidity (kg/T)**	Acidité Acidity (mg/l)***
6.1	1,5	2,52	508	7 665		14 970	6 160	6 522	1 647	12,32	216 144
6.2	3,0	4,21	421	2 550		2 600	370	1 133	94	0,74	12 973
6.3	4,6	3,08	423	3 313		4 140	728	1 804	187	1,46	25 527
6.4	6,1	3,07	423	3 966		5 560	1 149	2 422	299	2,30	40 313
6.5	7,6	2,74	496	5 078		8 570	2 332	3 734	615	4,66	81 842
6.6	9,1	4,10	384	3 180		3 530	573	1 538	147	1,15	20 121
6.7	10,7	2,95	420	8 342		18 120	8 699	7 895	2 336	17,40	305 225
6.8	12,2	3,31	370	5 331		8 600	2 346	3 747	618	4,69	82 325
6.10	15,2	3,63	368	3 687		5 100	1 003	2 222	260	2,01	35 186
6.11	16,8	3,30	388	4 884		7 720	1 958	3 364	514	3,92	68 712
6.12	18,3	2,88	434	7 580		15 930	6 888	6 941	1 845	13,78	241 687
6.13	19,8	3,26	383	6 903		12 730	4 618	5 546	1 230	9,24	162 020
6.14	21,3	3,18	398	5 972		10 850	3 492	4 727	926	6,98	122 512
6.15	22,8	3,50	366	4 968		8 060	2 104	3 512	553	4,21	73 831
6.16	24,4	3,52	380	2 454		3 340	529	1 455	135	1,06	18 553
6.17	25,9	3,25	386	5 561	1,0083	9 910	2 986	4 318	790	5,97	104 782
6.18	27,4	3,47	372	3 143	1,0051	4 520	832	1 969	215	1,66	29 182
6.19	28,9	3,06	399	4 933	1,0081	7 600	1 908	3 311	501	3,82	66 947
6.20	30,5	3,15	384	4 413	1,0070	6 320	1 411	2 754	368	2,82	49 493
6.21	32,0	3,34	368	4 256	1,0070	6 190	1 364	2 697	356	2,73	47 860
6.22	35,0	3,36	364	4 945	1,0085	8 910	2 491	3 882	657		
6.23	39,6	6,40	290	2 805	1,0038	3 110	477	1 355	121		
									Moy/Mean	5,14	90 262

*: *Acid: mg/l eq. CaCO3*

**: *Acid: eq. kg CaCO3/T de roche/ of rock*

***: *Acid. sur une base de 5,7% de teneur en eau*

***: *Acid. basis of a 5,7% water content*

Forage/Borehole 3 **Lixiviation/Leaching**

Echantillon Sample	Prof. Depth (m)	pH	Eh (mV)	Conduct. (uS)	Densité S.G. (g/cc)	S.D. TDS (mg/l)	Acidité Calc. Calc. Acidity (mg/l)*	SO4 calc. (mg/l)	Fe calc. (mg/l)	Acidité Acidity (kg/T)**	Acidité Acidity (mg/l)***
3.1	4,5	7,20	224	2 357	1,0050	2 130	281	928	71	0,56	9 863
3.2	6,1	7,56	214	1 705	1,0035	1 410	164	614	41	0,33	5 754
3.3	9,1	7,41	224	2 394	1,0039	2 250	303	980	76	0,61	10 625
3.4	10,7	7,80	217	751	1,0012	340	32	148	8	0,06	1 109
3.5	12,2	7,52	223	1 162	1,0015	720	73	314	18	0,15	2 559
3.6	13,5	6,47	226	1 499	1,0016	1 640	199	715	50	0,40	6 980
3.9	21,3	3,17	460	5 296		8 240	2 183	3 590	575	4,37	76 613
3.10	22,9	2,57	442	6 360	1,0093	10 060	3 064	4 383	811	6,13	107 521
3.11	24,4	6,57	243	1 269	1,0030	1 120	123	488	30	0,25	4 322
3.12	25,9	2,68	448	4 619	1,0064	9 330	2 694	4 065	712	5,39	94 516
3.13	27,4	6,50	218	628	1,0018	490	47	213	11	0,09	1 655
3.14	29,0	5,78	250	2 745	1,0029	2 720	394	1 185	100	0,79	13 821
3.15	30,5	3,77	330	1 137	1,0012	910	96	396	24	0,19	3 366
3.16	32,0	3,40	350	1 717	1,0021	1 610	194	701	48	0,39	6 816
3.17	33,5	2,44	490	5 865	1,0097	10 490	3 294	4 570	873	6,59	115 562
3.18	35,0	2,42	476	6 397	1,0111	11 360	3 782	4 950	1 004	7,56	132 696
3.19	42,0	3,92	416	2 044	1,0027	1 880	238	819	60		
3.20	44,1	4,45	332	1 149	1,0021	910	96	396	24		
3.21	46,6	2,38	588	7 134	1,0106	12 510	4 478	5 451	1 192		
									Moy/Mean	2,12	37 111

**: Acid: mg/l eq. CaCO3*
***: Acid: eq. kg CaCO3/T de roche/ of rock*
****: Acid. sur une base de 5,7% de teneur en eau*
****: Acid. basis of a 5,7% water content*

Forage/Borehole 4 **Lixiviation/Leaching**

Echantillon Sample	Prof. Depth (m)	pH	Eh (mV)	Conduct. (uS)	Densité S.G. (g/cc)	S.D. TDS (mg/l)	Acidité Calc. Calc. Acidity (mg/l)*	SO4 calc. (mg/l)	Fe calc. (mg/l)	Acidité Acidity (kg/T)**	Acidité Acidity (mg/l)***
4.1	1,5	4,35	400	2 249	1,0020	2 110	278	919	70	0,56	9 738
4.2	3,6	2,48	487	5 561		9 000	2 534	3 921	669	5,07	88 904
4.3	5,2	2,59	508	5 573		8 530	2 314	3 717	610	4,63	81 199
4.4	6,1	3,53	432	3 131		3 330	526	1 451	134	1,05	18 472
4.5	7,6	2,76	518	4 497		5 650	1 179	2 462	306	2,36	41 354
4.6	9,1	2,67	452	5 029		7 190	1 741	3 133	456	3,48	61 084
4.7	10,6	2,86	429	4 776		6 960	1 650	3 032	432	3,30	57 907
4.8	12,4	3,13	384	4 364		5 670	1 185	2 470	308	2,37	41 587
4.9	13,7	2,93	426	4 086	1,0067	5 670	1 185	2 470	308	2,37	41 587
4.10	15,2	3,39	367	3 567	1,0053	4 720	889	2 057	230	1,78	31 194
4.11	17,4	3,16	381	4 594	1,0064	6 210	1 371	2 706	358	2,74	48 109
4.12	18,3	3,39	346	4 183	1,0054	5 150	1 018	2 244	264	2,04	35 728
4.13	19,8	3,20	392	4 207	1,0067	5 780	1 222	2 518	318	2,44	42 880
4.14	21,3	3,53	353	4 135	1,0075	5 030	981	2 192	254	1,96	34 434
4.15	22,9	3,42	345	3 796	1,0052	4 400	798	1 917	206	1,60	28 004
4.16	24,4	3,74	331	3 240	1,0038	2 230	299	972	75	0,60	10 496
4.17	25,9	6,11	264	3 023	1,0054	3 350	531	1 460	136	1,06	18 634
4.18	27,4	3,53	355	3 216		3 580	585	1 560	150	1,17	20 542
4.19	29,0	3,55									
4.20	30,5	3,46	363	4 038	1,0054	5 100	1 003	2 222	260	2,01	35 186
4.21	32,0	4,09	340	3 155		3 610	593	1 573	152	1,19	20 797
									Moy/Mean	2,19	38 392

*: *Acid: mg/l eq. CaCO3*

**: *Acid: eq. kg CaCO3/T de roche/ of rock*

***: *Acid. sur une base de 5,7% de teneur en eau*

***: *Acid. basis of a 5,7% water content*

APPENDIX E-2

Mineralogical data from drill samples

Forage/Borehole 1 **Diffraction-X / X-Ray Diffraction**

Echantillon Sample	Prof. Depth (m)	Quartz (Ri)	Plagiocl. (Ri)	Calcite (Ri)	Pyrite (Ri)	Chlorite (Ri)	Muscovite (Ri)	Jarosite (Ri)	Gypsum (Ri)	Pyrophyl. (Ri)
1.1	1,5	61	0	0	18	60	51	0	17	0
1.2	3,0	59	0	0	29	57	37	0	48	0
1.3	5,0	39	0	0	24	49	28	50	30	0
1.4	6,1	50	0	0	12	67	50	58	49	7
1.5	7,6	46	0	0	22	41	39	8	37	0
1.6	9,1	53	0	0	15	74	29	35	11	0
1.7	10,7	40	6	0	59	27	22	35	9	0
1.8	12,2	56	0	0	21	50	37	46	21	12
1.9	13,7	32	30	0	19	24	28	90	23	0
1.10	15,2	31	38	0	11	93	23	35	32	0
1.11	16,8	38	20	0	27	84	23	27	11	0
1.12	18,3	21	14	0	9	55	23	82	62	0
1.13	19,8	41	8	0	15	10	44	32	42	0
1.14	21,3	49	0	21	24	23	59	45	72	0
1.15	22,8									

Ri: Relative intensity

Forage/Borehole 2 **Diffraction-X / X-Ray Diffraction**

Echantillon Sample	Prof. Depth (m)	Quartz (Ri)	Plagiocl. (Ri)	Calcite (Ri)	Pyrite (Ri)	Chlorite (Ri)	Muscovite (Ri)	Jarosite (Ri)	Gypsum (Ri)	Pyrophyl. (Ri)
2.1	1,5	57	9	21	35	130	77	0	0	0
2.2	3,0	75	0	16	31	21	53	0	0	0
2.3	5,0	39	17	67	14	63	82	0	26	0
2.4	9,1	56	0	24	27	23	64	0	80	0
2.5	10,7	66	0	0	20	23	100	0	96	0
2.6	16,8	77	0	0	16	2	46	0	17	0
2.7	18,3	38	0	0	31	15	23	70	21	0
2.8	19,8	39	0	0	43	69	43	28	9	0
2.9	21,3	49	9	0	34	62	38	22	17	0
2.10	22,9	52	0	0	32	54	31	0	13	72
2.11	25,0	50	0	0	20	20	13	0	27	66
2.12	26,2	37	0	0	32	32	19	0	18	100
2.13	27,4	60	37	0	18	8	19	0	18	0
2.14	28,9	34	40	0	25	27	42	0	16	0
2.15	30,5	39	43	0	7	37	24	0	12	0

Ri: Relative intensity

Forage/Borehole 3 **Diffraction-X / X-Ray Diffraction**

Echantillon Sample	Prof. Depth (m)	Quartz (Ri)	Plagiocl. (Ri)	Calcite (Ri)	Pyrite (Ri)	Chlorite (Ri)	Muscovite (Ri)	Jarosite (Ri)	Gypsum (Ri)	Pyrophyl. (Ri)
3.1	4,5	47	10	16	24	20	57	0	0	0
3.2	6,1	47	20	35	43	25	48	0	0	0
3.3	9,1	65	0	21	42	4	70	0	0	0
3.4	10,7	42	14	46	34	51	63	0	0	0
3.5	12,2	39	21	100	35	34	53	0	0	0
3.6	13,5	48	0	0	53	15	16	0	0	0
3.9	21,3	27	0	10	33	10	12	0	0	0
3.10	22,9	43	70	7	18	6	8	24	6	0
3.11	24,4	49	95	0	30	4	6	0	0	0
3.12	25,9	42	0	0	40	42	23	0	18	14
3.13	27,4	99	11	19	25	12	40	0	0	0
3.14	29,0	47	100	0	10	4	6	0	13	0
3.15	30,5	44	0	0	47	32	28	0	0	0
3.16	32,0	39	0	0	32	34	46	0	0	0
3.17	33,5	31	3	0	51	19	27	0	0	0
3.18	35,0	40	0	0	76	8	17	0	15	0
3.19	42,0	35	87	0	18	14	6	0	0	0
3.20	44,1	67	97	0	12	18	6	0	0	0
3.21	46,6	100	78	0	7	9	6	0	0	0

Ri: Relative intensity

Forage/Borehole 4 **Diffraction-X / X-Ray Diffraction**

Echantillon Sample	Prof. Depth (m)	Quartz (Ri)	Plagiocl. (Ri)	Calcite (Ri)	Pyrite (Ri)	Chlorite (Ri)	Muscovite (Ri)	Jarosite (Ri)	Gypsum (Ri)	Pyrophyl. (Ri)
4.1	1,5	65	0	0	34	34	58	0	0	0
4.2	3,6	64	0	0	16	16	71	22	47	0
4.3	5,2	49	14	0	22	22	35	100	19	0
4.4	6,1	51	22	0	16	16	23	55	0	0
4.5	7,6	91	14	0	18	18	56	77	66	0
4.6	9,1	44	0	0	36	36	39	0	12	22
4.7	10,6	26	2	0	48	48	24	9	0	11
4.8	12,4	49	0	0	41	41	49	0	0	0
4.9	13,7	45	0	0	52	52	40	0	4	0
4.10	15,2	26	0	0	35	35	20	0	0	0
4.11	17,4	28	0	0	33	33	23	24	7	0
4.12	18,3	41	28	0	30	30	17	24	25	0
4.13	19,8	42	39	0	25	25	30	17	6	0
4.14	21,3	37	21	0	30	30	78	0	6	0
4.15	22,9	32	0	0	51	51	56	0	9	0
4.16	24,4	21	0	0	40	40	4	0	0	0
4.17	25,9	67	15	0	20	20	35	20	40	0
4.18	27,4	47	0	0	45	45	11	0	0	0
4.19	29,0									
4.20	30,5	50	15	0	48	48	19	0	16	0
4.21	32,0	56	32	0	21	21	28	0	15	0

Ri: Relative intensity

Forage/Borehole 5 **Diffraction-X / X-Ray Diffraction**

Echantillon Sample	Prof. Depth (m)	Quartz (Ri)	Plagiocl. (Ri)	Calcite (Ri)	Pyrite (Ri)	Chlorite (Ri)	Muscovite (Ri)	Jarosite (Ri)	Gypsum (Ri)	Pyrophyl. (Ri)
5.1	1,5	83	5	0	17	9	61	0	17	0
5.2	3,0	84	8	0	15	6	42	49	44	0
5.3	4,6	59	7	0	36	4	47	43	45	0
5.4	6,1	47	0	5	18	28	36	58	32	0
5.5	7,6	48	0	0	54	18	50	0	0	0
5.6	9,1	40	0	0	35	24	43	0	0	0
5.7	10,7	55	0	0	60	18	43	0	0	0
5.8	12,2	33	7	0	66	23	42	0	0	0
5.9	13,7	32	0	0	45	14	73	49	15	0
5.10	15,2	55	68	0	8	7	0	22	6	0
5.11	16,8	56	91	0	12	7	0	0	25	0
5.12	18,3	56	19	0	21	30	39	0	29	0
5.13	19,8	54	26	0	62	19	20	0	0	15
5.14	21,2	60	9	0	19	63	23	0	0	0

Ri: Relative intensity

Forage/Borehole 6 **Diffraction-X / X-Ray Diffraction**

Echantillon Sample	Prof. Depth (m)	Quartz (Ri)	Plagiocl. (Ri)	Calcite (Ri)	Pyrite (Ri)	Chlorite (Ri)	Muscovite (Ri)	Jarosite (Ri)	Gypsum (Ri)	Pyrophyl. (Ri)
6.1	1,5	59	0	0	9	6	83	0	77	0
6.2	3,0	62	59	4	9	25	44	0	48	0
6.3	4,6	66	0	0	39	6	77	0	18	0
6.4	6,1	42	0	0	36	1	14	30	0	0
6.5	7,6	43	0	0	67	8	58	44	25	0
6.6	9,1	47	31	0	18	60	23	60	100	0
6.7	10,7	35	3	0	43	45	27	0	35	0
6.8	12,2	43	0	0	36	54	23	26	0	0
6.10	15,2	70	0	0	29	6	81	0	6	0
6.11	16,8	62	0	0	29	5	66	0	47	0
6.12	18,3	35	0	0	60	18	73	0	15	0
6.13	19,8	31	0	0	23	46	34	95	14	0
6.14	21,3	48	8	0	21	17	60	0	13	0
6.15	22,8	46	0	0	55	93	26	0	16	0
6.16	24,4	73	0	0	21	5	84	0	0	0
6.17	25,9	48	0	0	36	55	61	0	5	0
6.18	27,4	42	5	0	100	92	31	0	0	0
6.19	28,9	57	0	0	20	100	23	41	11	0
6.20	30,5	37	0	0	26	59	13	13	19	0
6.21	32,0	29	0	0	66	55	6	33	0	0
6.22	35,0	41	64	0	5	22	12	0	0	0
6.23	39,6	42	36	100	0	59	16	0	17	0

Ri: Relative intensity

APPENDIX F-1

Flow measurements at the ditch monitoring stations

FLOW MEASUREMENTS - 1991

Date	DAILY FLOW					AVERAGE WEEKLY FLOW					AVERAGE MONTHLY FLOW				
	Station 510 (l/m)	Station 511 (l/m)	Station 512 (l/m)	Combined Flow 3 stations (l/m)	Cumulative Volume 3 stations (m3)	Station 510 (l/m)	Station 511 (l/m)	Station 512 (l/m)	Aver. weekly Flow 3 stations (l/m)	Combined Volume 3 stations (m3)	Station 510 (l/m)	Station 511 (l/m)	Station 512 (l/m)	Aver. Monthly Flow 3 stations (l/m)	Combined Volume 3 stations (m3)
1/1/91	*100*	*45*	*11*	156	224	100,0	45,0	10,6	155,6	1120	100,0	45,0	10,6	155,6	5826
2/1/91	*100*	*45*	*11*	156	224										
3/1/91	*100*	*45*	*11*	156	224										
4/1/91	*100*	*45*	*11*	156	224										
5/1/91	*100*	*45*	*11*	156	224										
6/1/91	*100*	*45*	*11*	156	224	100,0	45,0	10,6	155,6	1568					
7/1/91	*100*	*45*	*11*	156	224										
8/1/91	*100*	*45*	*11*	156	224										
9/1/91	*100*	*45*	*11*	156	224										
10/1/91	*100*	*45*	*11*	156	224										
11/1/91	*100*	*45*	*11*	156	224										
12/1/91	*100*	*45*	*11*	156	224										
13/1/91	*100*	*45*	*11*	156	224	100,0	45,0	10,6	155,6	1568					
14/1/91	*100*	*45*	*11*	156	224										
15/1/91	*100*	*45*	*11*	156	224										
16/1/91	*100*	*45*	*11*	156	224										
17/1/91	*100*	*45*	*11*	156	224										
18/1/91	*100*	*45*	*11*	156	224										
19/1/91	*100*	*45*	*11*	156	224										
20/1/91	*100*	*45*	*11*	156	224	100,0	45,0	10,6	155,6	1568					
21/1/91	*100*	*45*	*11*	156	224										
22/1/91	*100*	*45*	*11*	156	224										
23/1/91	*100*	*45*	*11*	156	224										
24/1/91	*100*	*45*	*11*	156	224										
25/1/91	*100*	*45*	*11*	156	224										
26/1/91	*100*	*45*	*11*	156	224										
27/1/91	*100*	*45*	*11*	156	224	100,0	45,0	10,6	155,6	1568	100,0	45,0	10,6	155,6	8274
28/1/91	*100*	*45*	*11*	156	224										
29/1/91	*100*	*45*	*11*	156	224										
30/1/91	*100*	*45*	*11*	156	224										
31/1/91	*100*	*45*	*11*	156	224										
1/2/91	*100*	*45*	*11*	156	224										
2/2/91	*100*	*45*	*11*	156	224										
3/2/91	*100*	*45*	*11*	156	224	100,0	45,0	10,6	155,6	1568					
4/2/91	*100*	*45*	*11*	156	224										
5/2/91	*100*	*45*	*11*	156	224										
6/2/91	*100*	*45*	*11*	156	224										
7/2/91	*100*	*45*	*11*	156	224										
8/2/91	*100*	*45*	*11*	156	224										
9/2/91	*100*	*45*	*11*	156	224										
10/2/91	*100*	*45*	*11*	156	224	100,0	45,0	10,6	155,6	1568					
11/2/91	*100*	*45*	*11*	156	224										
12/2/91	*100*	*45*	*11*	156	224										
13/2/91	*100*	*45*	*11*	156	224										
14/2/91	*100*	*45*	*11*	156	224										
15/2/91	*100*	*45*	*11*	156	224										
16/2/91	*100*	*45*	*11*	156	224										
17/2/91	*100*	*45*	*11*	156	224	100,0	45,0	10,6	155,6	1568					
18/2/91	*100*	*45*	*11*	156	224										
19/2/91	*100*	*45*	*11*	156	224										
20/2/91	*100*	*45*	*11*	156	224										
21/2/91	*100*	*45*	*11*	156	224										
22/2/91	*100*	*45*	*11*	156	224										
23/2/91	*100*	*45*	*11*	156	224										
24/2/91	*150*	*70*	*31*	251	362	150,0	70,0	31,1	251,1	2531	150,0	70,0	31,1	251,1	12295
25/2/91	*150*	*70*	*31*	251	362										
26/2/91	*150*	*70*	*31*	251	362										
27/2/91	*150*	*70*	*31*	251	362										
28/2/91	*150*	*70*	*31*	251	362										
1/3/91	*150*	*70*	*31*	251	362										
2/3/91	*150*	*70*	*31*	251	362										
3/3/91	*150*	*70*	*31*	251	362	150,0	70,0	31,1	251,1	2531					
4/3/91	*150*	*70*	*31*	251	362										

Italic values are estimated

FLOW MEASUREMENTS - 1991

Date	DAILY FLOW					AVERAGE WEEKLY FLOW					AVERAGE MONTHLY FLOW				
	Station 510 (l/m)	Station 511 (l/m)	Station 512 (l/m)	Combined Flow 3 stations (l/m)	Cumulative Volume 3 stations (m3)	Station 510 (l/m)	Station 511 (l/m)	Station 512 (l/m)	Aver. weekly Flow 3 stations (l/m)	Combined Volume 3 stations (m3)	Station 510 (l/m)	Station 511 (l/m)	Station 512 (l/m)	Aver. Monthly Flow 3 stations (l/m)	Combined Volume 3 stations (m3)
5/3/91	*150*	*70*	*31*	251	362										
6/3/91	*150*	*70*	*31*	251	362										
7/3/91	*150*	*70*	*31*	251	362										
8/3/91	*150*	*70*	*31*	251	362										
9/3/91	*150*	*70*	*31*	251	362										
10/3/91	*150*	*70*	*31*	251	362	150,0	70,0	31,1	251,1	2531					
11/3/91	*150*	*70*	*31*	251	362										
12/3/91	*150*	*70*	*31*	251	362										
13/3/91	*150*	*70*	*31*	251	362										
14/3/91	*150*	*70*	*31*	251	362										
15/3/91	*150*	*70*	*31*	251	362										
16/3/91	*150*	*70*	*31*	251	362										
17/3/91	*150*	*70*	*31*	251	362	150,0	70,0	31,1	251,1	2170					
18/3/91	*150*	*70*	*31*	251	362										
19/3/91	*150*	*70*	*31*	251	362										
20/3/91	*150*	*70*	*31*	251	362										
21/3/91	*150*	*70*	*31*	251	362										
22/3/91	*150*	*70*	*31*	251	362										
24/3/91	*150*	*70*	*31*	251	362	150,0	70,0	31,1	251,1	2531					
25/3/91	*150*	*70*	*31*	251	362										
26/3/91	*150*	*70*	*31*	251	362										
27/3/91	*150*	*70*	*31*	251	362										
28/3/91	*150*	*70*	*31*	251	362										
29/3/91	*150*	*70*	*31*	251	362										
30/3/91	*150*	*70*	*31*	251	362										
31/3/91	*720*	*792*	*300*	1812	2609	719,7	792,1	300,0	1811,9	16264	620,3	585,4	410,3	1796,0	72413
1/4/91	*720*	*792*	*300*	1812	2609										
2/4/91	463	148	*300*	911	1312										
3/4/91	463	226	*300*	989	1424										
4/4/91	1232	2003	*300*	3535	5090										
5/4/91	*720*	*792*	*300*	1812	2609										
6/4/91	*720*	*792*	*300*	1812	2609										
7/4/91	*1020*	*340*	*415*	1775	2556	1019,1	336,9	415,0	1773,0	17872					
8/4/91	1422	575	*415*	2412	3473										
9/4/91	1182	322	*415*	1919	2763										
10/4/91	1182	225	*415*	1822	2624										
11/4/91	776	66	*415*	1279	1842										
12/4/91	776	66	296	1162	1673										
13/4/91	776	734	532	2042	2940										
14/4/91	776	915	532	2223	3201	843,7	691,6	535,6	2070,9	20874					
15/4/91	776	575	405	1756	2529										
16/4/91	1182	1345	535	3062	4409										
17/4/91	776	436	676	1892	2724										
18/4/91	776	436	532	1746	2514										
19/4/91	776	436	532	1746	2514										
20/4/91	*644*	*692*	*535*	2071	2982										
21/4/91	987	915	678	2580	3666	696,6	439,0	390,6	1526,1	15404					
22/4/91	776	575	405	1756	2529										
23/4/91	694	377	349	1420	2045										
24/4/91	521	271	296	1090	1570										
25/4/91	493	225	208	926	1333										
26/4/91	740	271	405	1416	2039										
27/4/91	*699*	*439*	*391*	1529	2202										
28/4/91	480	116	208	804	1156	529,3	190,4	145,7	865,4	8724	336,4	86,6	62,6	487,6	19867
29/4/91	436	116	137	691	995										
30/4/91	764	436	*147*	1349	1943										
1/5/91	542	185	137	864	1244										
2/5/91	521	185	137	843	1214										
3/5/91	431	103	107	641	923										
4/5/91	*529*	*190*	*147*	866	1247										
5/5/91	*337*	*81*	*84*	502	723	337,0	80,9	83,9	501,7	5057					
6/5/91	337	*81*	*84*	502	723										
7/5/91	417	116	107	640	922										

Italic values are estimated

FLOW MEASUREMENTS - 1991

Date	DAILY FLOW					AVERAGE WEEKLY FLOW					AVERAGE MONTHLY FLOW				
	Station 510 (l/m)	Station 511 (l/m)	Station 512 (l/m)	Combined Flow 3 stations (l/m)	Cumulative Volume 3 stations (m3)	Station 510 (l/m)	Station 511 (l/m)	Station 512 (l/m)	Aver weekly Flow 3 stations (l/m)	Combined Volume 3 stations (m3)	Station 510 (l/m)	Station 511 (l/m)	Station 512 (l/m)	Aver. Monthly Flow 3 stations (l/m)	Combined Volume 3 stations (m3)
8/5/91	*337*	*81*	*84*	502	723										
9/5/91	*337*	*81*	*84*	502	723										
10/5/91	257	45	80	382	521										
11/5/91	*337*	*81*	*84*	502	723										
12/5/91	*268*	*43*	*21*	352	507	267,7	43,0	20,7	351,4	3542					
13/5/91	278	45	22	345	497										
14/5/91	344	45	22	411	592										
15/5/91	257	45	22	324	467										
16/5/91	271	37	16	324	467										
17/5/91	*268*	*43*	*21*	352	507										
18/5/91	*268*	*43*	*21*	352	507										
19/5/91	*200*	*33*	*0*	233	336	199,7	32,7	0,1	232,5	2344					
20/5/91	250	30	0	280	403										
21/5/91	*200*	*33*	*0*	233	336										
22/5/91	236	18	0	254	366										
23/5/91	156	45	0	201	289										
24/5/91	156	37	0	193	278										
25/5/91	*200*	*33*	*0*	233	336										
26/5/91	*330*	*162*	*53*	545	785	330,0	161,7	52,9	544,6	5489	188,3	57,2	17,1	262,6	13235
27/5/91	400	148	60	608	876										
28/5/91	156	68	16	260	374										
29/5/91	*330*	*162*	*53*	545	785										
30/5/91	606	322	107	1037	1493										
31/5/91	156	88	28	272	392										
1/6/91	*330*	*162*	*53*	545	785										
2/6/91	*139*	*28*	*0*	167	241	139,0	28,1	0,2	167,3	1687					
3/6/91	156	45	1	202	290										
4/6/91	156	18	0	174	251										
5/6/91	122	18	0	140	202										
6/6/91	122	30	0	152	219										
7/6/91	139	30	0	169	243										
8/6/91	*139*	*28*	*0*	167	241										
9/6/91	*122*	*18*	*4*	144	207	122,0	18,0	4,1	144,1	1452					
10/6/91	*122*	*18*	0	140	202										
11/6/91	*122*	*18*	*4*	144	207										
12/6/91	*122*	*18*	*4*	144	207										
13/6/91	*122*	*18*	*4*	144	207										
14/6/91	122	18	9	149	214										
15/6/91	*122*	*18*	*4*	144	207										
16/6/91	*140*	*17*	*3*	160	231	140,0	17,0	3,2	160,2	1615					
17/6/91	140	17	3	160	231										
18/6/91	140	17	3	160	231										
19/6/91	140	17	3	160	231										
20/6/91	140	17	3	160	231										
21/6/91	140	17	3	160	231										
22/6/91	140	17	3	160	231										
23/6/91	140	17	3	160	231	210,3	61,3	25,2	296,8	2991					
24/6/91	140	17	3	160	231										
25/6/91	140	79	34	253	364										
26/6/91	263	79	34	376	541										
27/6/91	263	79	34	376	541										
28/6/91	263	79	34	376	541										
29/6/91	263	79	34	376	541										
30/6/91	263	79	34	376	541	250,4	97,3	34,0	381,7	3848	192,7	50,1	17,9	260,7	10512
1/7/91	263	79	34	376	541										
2/7/91	263	79	34	376	541										
3/7/91	241	111	34	386	556										
4/7/91	241	111	34	386	556										
5/7/91	241	111	34	386	556										
6/7/91	241	111	34	386	556										
7/7/91	241	111	34	386	556	173,1	39,6	11,0	223,8	2255					
8/7/91	241	111	34	386	556										
9/7/91	148	11	2	159	229										

Italic values are estimated

FLOW MEASUREMENTS - 1991

Date	DAILY FLOW Station 510 (l/m)	Station 511 (l/m)	Station 512 (l/m)	Combined Flow 3 stations (l/m)	Cumulative Volume 3 stations (m3)	AVERAGE WEEKLY FLOW Station 510 (l/m)	Station 511 (l/m)	Station 512 (l/m)	Aver. weekly Flow 3 stations (l/m)	Combined Volume 3 stations (m3)	AVERAGE MONTHLY FLOW Station 510 (l/m)	Station 511 (l/m)	Station 512 (l/m)	Aver. Monthly Flow 3 stations (l/m)	Combined Volume 3 stations (m3)
10/7/91	146	11	2	159	229										
11/7/91	146	11	2	159	229										
12/7/91	146	11	2	159	229										
13/7/91	146	11	2	159	229										
14/7/91	146	11	2	159	229	199,1	45,3	22,6	267,0	2691					
15/7/91	206	51	26	285	410										
16/7/91	206	51	26	285	410										
17/7/91	206	51	26	285	410										
18/7/91	206	51	26	285	410										
19/7/91	206	51	26	285	410										
20/7/91	206	51	26	285	410										
21/7/91	206	51	26	285	410	148,0	18,4	4,0	170,4	1718					
22/7/91	138	13	0	151	218										
23/7/91	138	13	0	151	218										
24/7/91	138	13	0	151	218										
25/7/91	138	13	0	151	218										
26/7/91	138	13	0	151	218										
27/7/91	138	13	0	151	218										
28/7/91	138	13	0	151	218	192,0	43,9	21,5	257,3	2594	141,0	26,4	11,6	181,3	9138
29/7/91	201	49	25	275	396										
30/7/91	201	49	25	275	396										
31/7/91	201	49	25	275	396										
1/8/91	201	49	25	275	396										
2/8/91	201	49	25	275	396										
3/8/91	201	49	25	275	396										
4/8/91	201	49	25	275	396	146,9	27,6	9,6	186,2	1877					
5/8/91	201	49	25	275	396										
6/8/91	126	19	4	151	217										
7/8/91	126	19	4	151	217										
8/8/91	126	19	4	151	217										
9/8/91	126	19	4	151	217										
10/8/91	126	19	4	151	217										
11/8/91	126	19	4	151	217	130,1	24,0	8,6	162,8	1641					
12/8/91	126	19	4	151	217										
13/8/91	131	26	11	168	241										
14/8/91	131	26	11	168	241										
15/8/91	131	26	11	168	241										
16/8/91	131	26	11	168	241										
17/8/91	131	26	11	168	241										
18/8/91	131	26	11	168	241	125,3	25,3	9,8	160,4	1617					
19/8/91	131	26	11	168	241										
20/8/91	123	25	10	158	227										
21/8/91	123	25	10	158	227										
22/8/91	123	25	10	158	227										
23/8/91	123	25	10	158	227										
24/8/91	123	25	10	158	227										
25/8/91	123	25	10	158	227	108,7	21,4	9,5	139,6	1406					
26/8/91	123	25	10	158	227										
27/8/91	103	20	10	133	191										
28/8/91	103	20	10	133	191										
29/8/91	103	20	10	133	191										
30/8/91	103	20	10	133	191										
31/8/91	103	20	10	133	191										
1/9/91	103	20	10	133	191	167,3	60,0	37,0	264,3	2664	196,0	85,6	53,9	337,7	13616
2/9/91	103	20	10	133	191										
3/9/91	193	76	48	317	456										
4/9/91	193	76	48	317	456										
5/9/91	193	76	48	317	456										
6/9/91	193	76	48	317	456										
7/9/91	193	76	48	317	456										
8/9/91	193	76	48	317	456	206,8	93,9	66,6	367,0	3699					
9/9/91	193	76	48	317	456										
10/9/91	212	101	74	387	557										

Italic values are estimated

FLOW MEASUREMENTS - 1991

Date	DAILY FLOW					AVERAGE WEEKLY FLOW					AVERAGE MONTHLY FLOW				
	Station 510 (l/m)	Station 511 (l/m)	Station 512 (l/m)	Combined Flow 3 stations (l/m)	Cumulative Volume 3 stations (m3)	Station 510 (l/m)	Station 511 (l/m)	Station 512 (l/m)	Aver. weekly Flow 3 stations (l/m)	Combined Volume 3 stations (m3)	Station 510 (l/m)	Station 511 (l/m)	Station 512 (l/m)	Aver. Monthly Flow 3 stations (l/m)	Combined Volume 3 stations (m3)
11/9/91	212	101	74	387	557										
12/9/91	212	101	74	387	557										
13/9/91	212	101	74	387	557										
14/9/91	212	101	74	387	557										
15/9/91	212	101	74	387	557	237,0	113,9	71,9	422,8	4262					
16/9/91	212	101	74	387	557										
17/9/91	247	119	*71*	437	629										
18/9/91	247	119	*71*	437	629										
19/9/91	247	119	*71*	437	629										
20/9/91	247	119	*71*	437	629										
21/9/91	247	119	*71*	437	629										
22/9/91	247	119	*71*	437	629	181,3	75,4	40,0	296,7	2991					
23/9/91	247	119	*71*	437	629										
24/9/91	155	58	*28*	241	346										
25/9/91	155	58	*28*	241	346										
26/9/91	155	58	*28*	241	346										
27/9/91	155	58	*28*	241	346										
28/9/91	155	58	*28*	241	346										
29/9/91	155	58	*28*	241	346	332,1	225,1	130,5	687,8	6933	271,8	122,5	77,8	472,0	19032
30/9/91	155	58	*28*	241	346										
1/10/91	403	292	*172*	867	1248										
2/10/91	403	292	*172*	867	1248										
3/10/91	403	292	*172*	867	1248										
4/10/91	403	292	*172*	867	1248										
5/10/91	403	292	*172*	867	1248										
6/10/91	403	292	*172*	867	1248	285,9	107,7	70,9	444,4	4480					
7/10/91	243	77	*54*	374	539										
8/10/91	243	77	*54*	374	539										
9/10/91	243	77	*54*	374	539										
10/10/91	243	77	*54*	374	539										
11/10/91	243	77	*54*	374	539										
12/10/91	243	77	*54*	374	539										
13/10/91	243	77	*54*	374	539	242,3	62,0	46,2	352,4	3553					
14/10/91	243	77	*54*	374	539										
15/10/91	242	56	*46*	344	495										
16/10/91	242	56	*46*	344	495										
17/10/91	242	56	*46*	344	495										
18/10/91	242	56	*46*	344	495										
19/10/91	242	56	*46*	344	495										
20/10/91	242	56	*46*	344	495	246,3	95,3	61,8	403,4	4066					
21/10/91	242	56	*46*	344	495										
22/10/91	248	111	*68*	427	615										
23/10/91	248	111	*68*	427	615										
24/10/91	248	111	*68*	427	615										
25/10/91	248	111	*68*	427	615										
26/10/91	248	111	*68*	427	615										
27/10/91	248	111	*68*	427	615	221,8	64,6	44,6	330,8	3334	196,4	66,1	46,2	332,7	16769
28/10/91	248	111	*68*	427	615										
29/10/91	211	46	*35*	292	421										
30/10/91	211	46	*35*	292	421										
31/10/91	211	46	*35*	292	421										
1/11/91	211	46	*35*	292	421										
2/11/91	211	46	*35*	292	421										
3/11/91	211	46	*35*	292	421	166,0	96,9	50,1	334,9	3376					
4/11/91	211	46	*35*	292	421										
5/11/91	176	120	*56*	352	507										
6/11/91	176	120	*56*	352	507										
7/11/91	176	120	*56*	352	507										
8/11/91	176	120	*56*	352	507										
9/11/91	176	120	*56*	352	507										
10/11/91	176	120	*56*	352	507	172,4	96,4	46,2	315,0	3175					
11/11/91	176	120	*56*	352	507										
12/11/91	171	87	*42*	300	432										

Italic values are estimated

FLOW MEASUREMENTS - 1991

Date	DAILY FLOW					AVERAGE WEEKLY FLOW					AVERAGE MONTHLY FLOW				
	Station 510 (l/m)	Station 511 (l/m)	Station 512 (l/m)	Combined Flow 3 stations (l/m)	Cumulative Volume 3 stations (m3)	Station 510 (l/m)	Station 511 (l/m)	Station 512 (l/m)	Aver. weekly Flow 3 stations (l/m)	Combined Volume 3 stations (m3)	Station 510 (l/m)	Station 511 (l/m)	Station 512 (l/m)	Aver. Monthly Flow 3 stations (l/m)	Combined Volume 3 stations (m3)
13/11/91	171	87	*42*	300	432										
14/11/91	171	87	*42*	300	432										
15/11/91	171	87	*42*	300	432										
16/11/91	171	87	*42*	300	432										
17/11/91	171	87	*42*	300	432	196,0	91,3	49,3	336,6	3393					
18/11/91	171	87	*42*	300	432										
19/11/91	208	93	*52*	351	506										
20/11/91	208	93	*52*	351	506										
21/11/91	208	93	*52*	351	506										
22/11/91	208	93	*52*	351	506										
23/11/91	208	93	*52*	351	506										
24/11/91	208	93	*52*	351	506	206,0	89,4	50,6	346,2	3490					
25/11/91	208	93	*52*	351	506										
26/11/91	208	88	*50*	344	496										
27/11/91	208	88	*50*	344	496										
28/11/91	208	88	*50*	344	496										
29/11/91	208	88	*50*	344	496										
30/11/91	208	88	*50*	344	496										
1/12/91	208	88	*50*	344	496	181,7	77,3	40,6	299,6	3022	166,7	59,9	31,3	259,9	11924
2/12/91	208	88	*50*	344	496										
3/12/91	172	73	*37*	282	406										
4/12/91	172	73	*37*	282	406										
5/12/91	172	73	*37*	282	406										
6/12/91	172	73	*37*	282	406										
7/12/91	172	73	*37*	282	406										
8/12/91	172	73	*37*	282	406	175,6	71,6	37,3	284,4	2867					
9/12/91	172	73	*37*	282	406										
10/12/91	177	71	*37*	285	411										
11/12/91	177	71	*37*	285	411										
12/12/91	177	71	*37*	285	411										
13/12/91	177	71	*37*	285	411										
14/12/91	177	71	*37*	285	411										
15/12/91	177	71	*37*	285	411	175,6	71,7	37,3	284,6	2869					
16/12/91	177	71	*37*	285	411										
17/12/91	175	72	*37*	284	409										
18/12/91	175	72	*37*	284	409										
19/12/91	175	72	*37*	284	409										
20/12/91	175	72	*37*	284	409										
21/12/91	175	72	*37*	284	409										
22/12/91	175	72	*37*	284	409	156,6	44,9	23,3	226,7	2266					
23/12/91	175	72	*37*	284	409										
24/12/91	152	34	*18*	204	293										
25/12/91	152	34	*18*	204	293										
26/12/91	152	34	*18*	204	293										
27/12/91	152	34	*18*	204	293										
28/12/91	152	34	*18*	204	293										
29/12/91	152	34	*18*	204	293	152,0	34,0	17,7	203,7	880					
30/12/91	152	34	*18*	204	293										
31/12/91	152	34	*18*	204	293										
1/1/92															
2/1/91															
3/1/91															
4/1/91															
TOTAL					210897					210897					210897

Italic values are estimated

FLOW MEASUREMENTS - 1992

Date	DAILY FLOW			DAILY VOLUME			CUMULATIVE DAILY VOLUME					
	Flow 510 (l/m)	Flow 511 (l/m)	Flow 512 (l/m)	Volume 510 (m3)	Volume 511 (m3)	Volume 512 (m3)	Cumulative Volume 510 (m3)	Cumulative Volume 511 (m3)	Cumulative Volume 512 (m3)	Combined Flow 3 stations (l/m)	Combined Volume 3 stations (m3)	Cumulative Volume 3 stations (m3)
1/1/92	*100*	*45*	*11*	*144*	*65*	*15*	*144*	*65*	*15*	156	224	224
2/1/92	*100*	*45*	*11*	*144*	*65*	*15*	*288*	*130*	*30*	156	224	448
3/1/92	*100*	*45*	*11*	*144*	*65*	*15*	*432*	*195*	*46*	156	224	672
4/1/92	*100*	*45*	*11*	*144*	*65*	*15*	*576*	*259*	*61*	156	224	896
5/1/92	*100*	*45*	*11*	*144*	*65*	*15*	*720*	*324*	*76*	156	224	1120
6/1/92	*100*	*45*	*11*	*144*	*65*	*15*	*864*	*389*	*91*	156	224	1344
7/1/92	*100*	*45*	*11*	*144*	*65*	*15*	*1008*	*454*	*107*	156	224	1568
8/1/92	*100*	*45*	*11*	*144*	*65*	*15*	*1152*	*519*	*122*	156	224	1792
9/1/92	*100*	*45*	*11*	*144*	*65*	*15*	*1296*	*583*	*137*	156	224	2017
10/1/92	*100*	*45*	*11*	*144*	*65*	*15*	*1440*	*648*	*152*	156	224	2241
11/1/92	*100*	*45*	*11*	*144*	*65*	*15*	*1584*	*713*	*168*	156	224	2465
12/1/92	*100*	*45*	*11*	*144*	*65*	*15*	*1728*	*778*	*183*	156	224	2689
13/1/92	*100*	*45*	*11*	*144*	*65*	*15*	*1872*	*843*	*198*	156	224	2913
14/1/92	*100*	*45*	*11*	*144*	*65*	*15*	*2016*	*907*	*213*	156	224	3137
15/1/92	*100*	*45*	*11*	*144*	*65*	*15*	*2160*	*972*	*229*	156	224	3361
16/1/92	*100*	*45*	*11*	*144*	*65*	*15*	*2304*	*1037*	*244*	156	224	3585
17/1/92	*100*	*45*	*11*	*144*	*65*	*15*	*2448*	*1102*	*259*	156	224	3809
18/1/92	*100*	*45*	*11*	*144*	*65*	*15*	*2592*	*1167*	*275*	156	224	4033
19/1/92	*100*	*45*	*11*	*144*	*65*	*15*	*2736*	*1231*	*290*	156	224	4257
20/1/92	*100*	*45*	*11*	*144*	*65*	*15*	*2880*	*1296*	*305*	156	224	4481
21/1/92	*100*	*45*	*11*	*144*	*65*	*15*	*3024*	*1361*	*320*	156	224	4705
22/1/92	*100*	*45*	*11*	*144*	*65*	*15*	*3168*	*1426*	*336*	156	224	4929
23/1/92	*100*	*45*	*11*	*144*	*65*	*15*	*3312*	*1491*	*351*	156	224	5153
24/1/92	*100*	*45*	*11*	*144*	*65*	*15*	*3456*	*1555*	*366*	156	224	5378
25/1/92	*100*	*45*	*11*	*144*	*65*	*15*	*3600*	*1620*	*381*	156	224	5602
26/1/92	*100*	*45*	*11*	*144*	*65*	*15*	*3744*	*1685*	*397*	156	224	5826
27/1/92	*100*	*45*	*11*	*144*	*65*	*15*	*3888*	*1750*	*412*	156	224	6050
28/1/92	*100*	*45*	*11*	*144*	*65*	*15*	*4032*	*1815*	*427*	156	224	6274
29/1/92	*100*	*45*	*11*	*144*	*65*	*15*	*4176*	*1879*	*442*	156	224	6498
30/1/92	*100*	*45*	*11*	*144*	*65*	*15*	*4320*	*1944*	*458*	156	224	6722
31/1/92	*100*	*45*	*11*	*144*	*65*	*15*	*4464*	*2009*	*473*	156	224	6946
1/2/92	*100*	*45*	*11*	*144*	*65*	*15*	*4608*	*2074*	*488*	156	224	7170
2/2/92	*100*	*45*	*11*	*144*	*65*	*15*	*4752*	*2139*	*504*	156	224	7394
3/2/92	*100*	*45*	*11*	*144*	*65*	*15*	*4896*	*2203*	*519*	156	224	7618
4/2/92	*100*	*45*	*11*	*144*	*65*	*15*	*5040*	*2268*	*534*	156	224	7842
5/2/92	*100*	*45*	*11*	*144*	*65*	*15*	*5184*	*2333*	*549*	156	224	8066
6/2/92	*100*	*45*	*11*	*144*	*65*	*15*	*5328*	*2398*	*565*	156	224	8290
7/2/92	*100*	*45*	*11*	*144*	*65*	*15*	*5472*	*2463*	*580*	156	224	8515
8/2/92	*100*	*45*	*11*	*144*	*65*	*15*	*5616*	*2527*	*595*	156	224	8739
9/2/92	*100*	*45*	*11*	*144*	*65*	*15*	*5760*	*2592*	*610*	156	224	8963
10/2/92	*100*	*45*	*11*	*144*	*65*	*15*	*5904*	*2657*	*626*	156	224	9187
11/2/92	*100*	*45*	*11*	*144*	*65*	*15*	*6048*	*2722*	*641*	156	224	9411

Italic values are estimated

FLOW MEASUREMENTS - 1992

Date	DAILY FLOW			DAILY VOLUME			CUMULATIVE DAILY VOLUME					
	Flow 510 (l/m)	Flow 511 (l/m)	Flow 512 (l/m)	Volume 510 (m3)	Volume 511 (m3)	Volume 512 (m3)	Cumulative Volume 510 (m3)	Cumulative Volume 511 (m3)	Cumulative Volume 512 (m3)	Combined Flow 3 stations (l/m)	Combined Volume 3 stations (m3)	Cumulative Volume 3 stations (m3)
12/2/92	*100*	*45*	*11*	*144*	*65*	*15*	*6192*	*2787*	*656*	156	224	9635
13/2/92	*100*	*45*	*11*	*144*	*65*	*15*	*6336*	*2851*	*672*	156	224	9859
14/2/92	*100*	*45*	*11*	*144*	*65*	*15*	*6480*	*2916*	*687*	156	224	10083
15/2/92	*100*	*45*	*11*	*144*	*65*	*15*	*6624*	*2981*	*702*	156	224	10307
16/2/92	*100*	*45*	*11*	*144*	*65*	*15*	*6768*	*3046*	*717*	156	224	10531
17/2/92	*100*	*45*	*11*	*144*	*65*	*15*	*6912*	*3111*	*733*	156	224	10755
18/2/92	*100*	*45*	*11*	*144*	*65*	*15*	*7056*	*3175*	*748*	156	224	10979
19/2/92	*100*	*45*	*11*	*144*	*65*	*15*	*7200*	*3240*	*763*	156	224	11203
20/2/92	*100*	*45*	*11*	*144*	*65*	*15*	*7344*	*3305*	*778*	156	224	11427
21/2/92	*100*	*45*	*11*	*144*	*65*	*15*	*7488*	*3370*	*794*	156	224	11651
22/2/92	*100*	*45*	*11*	*144*	*65*	*15*	*7632*	*3435*	*809*	156	224	11876
23/2/92	*100*	*45*	*11*	*144*	*65*	*15*	*7776*	*3499*	*824*	156	224	12100
24/2/92	*150*	*70*	*31*	*216*	*101*	*45*	*7992*	*3600*	*869*	251	362	12461
25/2/92	*150*	*70*	*31*	*216*	*101*	*45*	*8208*	*3701*	*914*	251	362	12823
26/2/92	*150*	*70*	*31*	*216*	*101*	*45*	*8424*	*3802*	*959*	251	362	13184
27/2/92	*150*	*70*	*31*	*216*	*101*	*45*	*8640*	*3903*	*1003*	251	362	13546
28/2/92	*150*	*70*	*31*	*216*	*101*	*45*	*8856*	*4003*	*1048*	251	362	13908
29/2/92	*150*	*70*	*31*	*216*	*101*	*45*	*9072*	*4104*	*1093*	251	362	14269
1/3/92	*150*	*70*	*31*	*216*	*101*	*45*	*9288*	*4205*	*1138*	251	362	14631
2/3/92	*150*	*70*	*31*	*216*	*101*	*45*	*9504*	*4306*	*1182*	251	362	14992
3/3/92	*150*	*70*	*31*	*216*	*101*	*45*	*9720*	*4407*	*1227*	251	362	15354
4/3/92	*150*	*70*	*31*	*216*	*101*	*45*	*9936*	*4507*	*1272*	251	362	15715
5/3/92	*150*	*70*	*31*	*216*	*101*	*45*	*10152*	*4608*	*1317*	251	362	16077
6/3/92	*150*	*70*	*31*	*216*	*101*	*45*	*10368*	*4709*	*1362*	251	362	16439
7/3/92	*150*	*70*	*31*	*216*	*101*	*45*	*10584*	*4810*	*1406*	251	362	16800
8/3/92	*150*	*70*	*31*	*216*	*101*	*45*	*10800*	*4911*	*1451*	251	362	17162
9/3/92	*150*	*70*	*31*	*216*	*101*	*45*	*11016*	*5011*	*1496*	251	362	17524
10/3/92	*150*	*70*	*31*	*216*	*101*	*45*	*11232*	*5112*	*1541*	251	362	17885
11/3/92	*150*	*70*	*31*	*216*	*101*	*45*	*11448*	*5213*	*1586*	251	362	18247
12/3/92	*150*	*70*	*31*	*216*	*101*	*45*	*11664*	*5314*	*1631*	251	362	18608
13/3/92	*150*	*70*	*31*	*216*	*101*	*45*	*11880*	*5415*	*1675*	251	362	18970
14/3/92	*150*	*70*	*31*	*216*	*101*	*45*	*12096*	*5515*	*1720*	251	362	19332
15/3/92	*150*	*70*	*31*	*216*	*101*	*45*	*12312*	*5616*	*1765*	251	362	19693
16/3/92	*150*	*70*	*31*	*216*	*101*	*45*	*12528*	*5717*	*1810*	251	362	20055
17/3/92	*150*	*70*	*31*	*216*	*101*	*45*	*12744*	*5818*	*1855*	251	362	20416
18/3/92	*150*	*70*	*31*	*216*	*101*	*45*	*12960*	*5919*	*1899*	251	362	20778
19/3/92	*150*	*70*	*31*	*216*	*101*	*45*	*13176*	*6019*	*1944*	251	362	21140
20/3/92	*150*	*70*	*31*	*216*	*101*	*45*	*13392*	*6120*	*1989*	251	362	21501
21/3/92	*150*	*70*	*31*	*216*	*101*	*45*	*13608*	*6221*	*2034*	251	362	21863
22/3/92	*150*	*70*	*31*	*216*	*101*	*45*	*13824*	*6322*	*2079*	251	362	22224
23/3/92	*150*	*70*	*31*	*216*	*101*	*45*	*14040*	*6423*	*2123*	251	362	22586
24/3/92	*150*	*70*	*31*	*216*	*101*	*45*	*14256*	*6523*	*2168*	251	362	22948

Italic values are estimated

FLOW MEASUREMENTS - 1992

Date	DAILY FLOW			DAILY VOLUME			CUMULATIVE DAILY VOLUME					
	Flow 510 (l/m)	Flow 511 (l/m)	Flow 512 (l/m)	Volume 510 (m3)	Volume 511 (m3)	Volume 512 (m3)	Cumulative Volume 510 (m3)	Cumulative Volume 511 (m3)	Cumulative Volume 512 (m3)	Combined Flow 3 stations (l/m)	Combined Volume 3 stations (m3)	Cumulative Volume 3 stations (m3)
25/3/92	*150*	*70*	*31*	*216*	*101*	*45*	*14472*	*6624*	*2213*	251	362	23309
26/3/92	*150*	*70*	*31*	*216*	*101*	*45*	*14688*	*6725*	*2258*	251	362	23671
27/3/92	*150*	*70*	*31*	*216*	*101*	*45*	*14904*	*6826*	*2303*	251	362	24032
28/3/92	*150*	*70*	*31*	*216*	*101*	*45*	*15120*	*6927*	*2347*	251	362	24394
29/3/92	*150*	*70*	*31*	*216*	*101*	*45*	*15336*	*7027*	*2392*	251	362	24756
30/3/92	*150*	*70*	*31*	*216*	*101*	*45*	*15552*	*7128*	*2437*	251	362	25117
31/3/92	*150*	*70*	*31*	*216*	*101*	*45*	*15768*	*7229*	*2482*	251	362	25479
1/4/92	*150*	*70*	*31*	*216*	*101*	*45*	*15984*	*7330*	*2527*	251	362	25840
2/4/92	150	70	*31*	*216*	*101*	*45*	*16200*	*7431*	*2571*	251	362	26202
3/4/92	106	34	44	153	48	64	16353	7479	2635	184	265	26467
4/4/92	*106*	*33*	*47*	*153*	*47*	*68*	*16506*	*7526*	*2703*	186	268	26735
5/4/92	*106*	*33*	*48*	*153*	*48*	*69*	*16659*	*7574*	*2772*	188	270	27005
6/4/92	*106*	*33*	*48*	*153*	*48*	*69*	*16812*	*7622*	*2841*	188	270	27275
7/4/92	*106*	33	*47*	*153*	*48*	*68*	*16965*	*7670*	2909	187	269	27544
8/4/92	106	33	47	153	47	68	17118	7717	2977	186	268	27812
9/4/92	199	206	34	287	296	49	17405	8013	3026	439	632	28444
10/4/92	423	540	61	609	777	88	18014	8790	3114	1024	1474	29918
11/4/92	174	180	11	250	259	16	18264	9049	3130	365	525	30443
12/4/92	*113*	*87*	*6*	*162*	*125*	*9*	*18426*	*9174*	*3139*	206	296	30739
13/4/92	113	87	6	163	125	8	18589	9299	3147	206	296	31035
14/4/92	97	60	1	140	86	1	18729	9385	3148	158	227	31262
15/4/92	176	206	498	253	297	717	18982	9682	3865	880	1267	32529
16/4/92	306	394	31	440	568	44	19422	10250	3909	731	1052	33581
17/4/92	367	592	81	529	852	116	19951	11102	4025	1040	1497	35078
18/4/92	303	990	169	437	1426	244	20388	12528	4269	1463	2107	37185
19/4/92	729	1424	277	1050	2050	399	21438	14578	4668	2430	3499	40684
20/4/92	1052	2028	504	1515	2920	726	22953	17498	5394	3584	5161	45845
21/4/92	1338	2488	848	1926	3582	1221	24879	21080	6615	4673	6729	52574
22/4/92	1969	2963	2040	2836	4267	2937	27715	25347	9552	6972	10040	62614
23/4/92	1978	2113	2129	2848	3043	3066	30563	28390	12618	6220	8957	71571
24/4/92	1033	757	572	1487	1090	823	32050	29480	13441	2361	3400	74971
25/4/92	938	*521*	*295*	*1350*	*750*	*425*	*33400*	*30230*	*13866*	1753	2525	77496
26/4/92	*938*	*521*	*296*	*1350*	*750*	*426*	*34750*	*30980*	*14292*	1754	2526	80022
27/4/92	938	521	295	1350	750	425	36100	31730	14717	1753	2525	82547
28/4/92	*858*	*289*	*125*	*1236*	*416*	*180*	*37336*	*32146*	*14897*	1272	1832	84379
29/4/92	858	289	115	1236	416	166	38572	32562	15063	1263	1818	86197
30/4/92	556	162	86	801	233	124	39373	32795	15187	804	1158	87355
1/5/92	*849*	*682*	*365*	*1222*	*982*	*526*	*40595*	*33777*	*15713*	1896	2730	90085
2/5/92	*849*	*681*	*393*	*1222*	*981*	*566*	*41817*	*34758*	*16279*	1923	2769	92854
3/5/92	*849*	*682*	*394*	*1222*	*982*	*567*	*43039*	*35740*	*16846*	1924	2771	95625
4/5/92	848	681	393	*1221*	981	566	*44260*	*36721*	*17412*	1922	2768	98393
5/5/92	572	255	207	824	367	298	45084	37088	17710	1034	1489	99882

Italic values are estimated

FLOW MEASUREMENTS - 1992

Date	DAILY FLOW			DAILY VOLUME			CUMULATIVE DAILY VOLUME					
	Flow 510 (l/m)	Flow 511 (l/m)	Flow 512 (l/m)	Volume 510 (m3)	Volume 511 (m3)	Volume 512 (m3)	Cumulative Volume 510 (m3)	Cumulative Volume 511 (m3)	Cumulative Volume 512 (m3)	Combined Flow 3 stations (l/m)	Combined Volume 3 stations (m3)	Cumulative Volume 3 stations (m3)
6/5/92	527	176	114	759	253	164	45843	37341	17874	817	1176	101058
7/5/92	570	135	76	821	194	110	46664	37535	17984	781	1125	102183
8/5/92	480	103	51	691	149	74	47355	37684	18058	635	914	103097
9/5/92	*374*	*70*	*25*	*538*	*101*	*36*	*47893*	*37785*	*18094*	469	675	103772
10/5/92	*374*	*71*	*24*	*538*	*102*	*35*	*48431*	*37887*	*18129*	469	675	104447
11/5/92	374	70	25	538	101	36	48969	37988	18165	469	675	105122
12/5/92	367	51	19	528	73	27	49497	38061	18192	436	628	105750
13/5/92	722	433	221	1039	624	318	50536	38685	18510	1376	1981	107731
14/5/92	377	170	100	543	245	144	51079	38930	18654	647	932	108663
15/5/92	366	120	74	527	173	106	51606	39103	18760	560	806	109469
16/5/92	*376*	*134*	*63*	*541*	*193*	*91*	*52147*	*39296*	*18851*	573	825	110294
17/5/92	*376*	*133*	*63*	*542*	*192*	*91*	*52689*	*39488*	*18942*	573	825	111119
18/5/92	376	134	63	541	193	91	53230	39681	19033	573	825	111944
19/5/92	278	74	13	400	106	18	53630	39787	19051	364	524	112468
20/5/92	*279*	*46*	*10*	*402*	*66*	*14*	*54032*	*39853*	*19065*	335	482	112950
21/5/92	279	46	10	402	66	14	54434	39919	19079	335	482	113432
22/5/92	224	29	1	323	42	1	54757	39961	19080	254	366	113798
23/5/92	*182*	*32*	*5*	*262*	*46*	*7*	*55019*	*40007*	*19087*	219	315	114113
24/5/92	*183*	*32*	*4*	*263*	*46*	*6*	*55282*	*40053*	*19093*	219	315	114428
25/5/92	*182*	*33*	*5*	*262*	*47*	*7*	*55544*	*40100*	*19100*	219	316	114744
26/5/92	*182*	*32*	*5*	*262*	*46*	*7*	*55806*	*40146*	*19107*	219	315	115059
27/5/92	*182*	*32*	*4*	*262*	*46*	*6*	*56068*	*40192*	*19113*	218	314	115373
28/5/92	*183*	*32*	*5*	*263*	*46*	*7*	*56331*	*40238*	*19120*	219	316	115689
29/5/92	*182*	*32*	*5*	*262*	*46*	*7*	*56593*	*40284*	*19127*	219	315	116004
30/5/92	*182*	*33*	*4*	*262*	*47*	*6*	*56855*	*40331*	*19133*	219	315	116319
31/5/92	*182*	*32*	*5*	*262*	*46*	*7*	*57117*	*40377*	*19140*	219	315	116634
1/6/92	*183*	*32*	*5*	*263*	*46*	*7*	*57380*	*40423*	*19147*	219	316	116950
2/6/92	*182*	*32*	*5*	*262*	*46*	*7*	*57642*	*40469*	*19154*	219	315	117265
3/6/92	*182*	*32*	*4*	*262*	*46*	*6*	*57904*	*40515*	*19160*	218	314	117579
4/6/92	*182*	*33*	*5*	*262*	*47*	*7*	*58166*	*40562*	*19167*	219	316	117895
5/6/92	*183*	*32*	*5*	*263*	*46*	*7*	*58429*	*40608*	*19174*	219	316	118211
6/6/92	*182*	*32*	*4*	*262*	*46*	*6*	*58691*	*40654*	*19180*	218	314	118525
7/6/92	*182*	*32*	*5*	*262*	*46*	*7*	*58953*	*40700*	*19187*	219	315	118840
8/6/92	*182*	*32*	*5*	*262*	*46*	*7*	*59215*	*40746*	*19194*	219	315	119155
9/6/92	*183*	*33*	*4*	*263*	*47*	*6*	*59478*	*40793*	*19200*	219	316	119471
10/6/92	*182*	*32*	*5*	*262*	*46*	*7*	*59740*	*40839*	*19207*	219	315	119786
11/6/92	*182*	*32*	*5*	*262*	*46*	*7*	*60002*	*40885*	*19214*	219	315	120101
12/6/92	*182*	*32*	*4*	*262*	*46*	*6*	*60264*	*40931*	*19220*	218	314	120415
13/6/92	*183*	*32*	*5*	*263*	*46*	*7*	*60527*	*40977*	*19227*	219	316	120731
14/6/92	*182*	*33*	*5*	*262*	*47*	*7*	*60789*	*41024*	*19234*	219	316	121047
15/6/92	*182*	*32*	*4*	*262*	*46*	*6*	*61051*	*41070*	*19240*	218	314	121361
16/6/92	*182*	*32*	*5*	*262*	*46*	*7*	*61313*	*41116*	*19247*	219	315	121676

Italic values are estimated

FLOW MEASUREMENTS - 1992

Date	DAILY FLOW			DAILY VOLUME			CUMULATIVE DAILY VOLUME					
	Flow 510 (l/m)	Flow 511 (l/m)	Flow 512 (l/m)	Volume 510 (m3)	Volume 511 (m3)	Volume 512 (m3)	Cumulative Volume 510 (m3)	Cumulative Volume 511 (m3)	Cumulative Volume 512 (m3)	Combined Flow 3 stations (l/m)	Combined Volume 3 stations (m3)	Cumulative Volume 3 stations (m3)
17/6/92	*183*	*32*	*5*	*263*	*46*	*7*	*61576*	*41162*	*19254*	219	316	121992
18/6/92	*182*	*32*	*5*	*262*	*46*	*7*	*61838*	*41208*	*19261*	219	315	122307
19/6/92	*182*	*33*	*4*	*262*	*47*	*6*	*62100*	*41255*	*19267*	219	315	122622
20/6/92	*182*	*32*	*5*	*262*	*46*	*7*	*62362*	*41301*	*19274*	219	315	122937
21/6/92	*183*	*32*	*5*	*263*	*46*	*7*	*62625*	*41347*	*19281*	219	316	123253
22/6/92	*182*	*32*	*4*	*262*	*46*	*6*	*62887*	*41393*	*19287*	218	314	123567
23/6/92	*182*	*32*	*5*	*262*	*46*	*7*	*63149*	*41439*	*19294*	219	315	123882
24/6/92	*182*	*33*	*5*	*262*	*47*	*7*	*63411*	*41486*	*19301*	219	316	124198
25/6/92	*182*	*32*	*4*	*262*	*46*	*6*	*63673*	*41532*	*19307*	218	314	124512
26/6/92	183	32	5	263	46	7	63936	41578	19314	219	316	124828
27/6/92	*138*	*10*	*1*	*199*	*15*	*1*	*64135*	*41593*	*19315*	149	215	125043
28/6/92	*138*	*10*	*1*	*199*	*15*	*1*	*64334*	*41608*	*19316*	149	215	125258
29/6/92	*138*	*10*	*1*	*199*	*15*	*2*	*64533*	*41623*	*19318*	150	216	125474
30/6/92	*138*	*10*	*1*	*199*	*15*	*1*	*64732*	*41638*	*19319*	149	215	125689
1/7/92	138	10	1	199	15	1	64931	41653	19320	149	215	125904
2/7/92	*178*	*56*	*19*	*256*	*80*	*27*	*65187*	*41733*	*19347*	252	363	126267
3/7/92	*177*	*56*	*19*	*255*	*80*	*27*	*65442*	*41813*	*19374*	251	362	126629
4/7/92	*178*	*56*	*19*	*256*	*80*	*27*	*65698*	*41893*	*19401*	252	363	126992
5/7/92	*177*	*56*	*19*	*255*	*80*	*27*	*65953*	*41973*	*19428*	251	362	127354
6/7/92	*177*	*56*	*19*	*255*	*80*	*27*	*66208*	*42053*	*19455*	251	362	127716
7/7/92	178	56	19	256	80	27	66464	42133	19482	252	363	128079
8/7/92	*141*	*19*	*1*	*203*	*28*	*2*	*66667*	*42161*	*19484*	162	233	128312
9/7/92	*141*	*19*	*1*	*203*	*27*	*1*	*66870*	*42188*	*19485*	160	231	128543
10/7/92	141	19	1	203	28	2	67073	42216	19487	162	233	128776
11/7/92	*120*	*25*	*5*	*173*	*36*	*7*	*67246*	*42252*	*19494*	150	216	128992
12/7/92	*121*	*24*	*5*	*174*	*35*	*7*	*67420*	*42287*	*19501*	150	216	129208
13/7/92	*120*	*25*	*5*	*173*	*36*	*7*	*67593*	*42323*	*19508*	150	216	129424
14/7/92	120	0	5	173	0	7	67766	42323	19515	125	180	129604
15/7/92	117	3	1	168	4	1	67934	42327	19516	120	173	129777
16/7/92	*113*	*6*	*1*	*163*	*9*	*1*	*68097*	*42336*	*19517*	120	173	129950
17/7/92	113	6	0	163	9	0	68260	42345	19517	119	172	130122
18/7/92	*128*	*9*	*1*	*184*	*13*	*1*	*68444*	*42358*	*19518*	138	198	130320
19/7/92	*128*	*10*	*1*	*185*	*14*	*2*	*68629*	*42372*	*19520*	140	201	130521
20/7/92	128	9	1	184	13	2	68813	42385	19522	138	199	130720
21/7/92	*98*	*4*	*1*	*141*	*6*	*1*	*68954*	*42391*	*19523*	103	148	130868
22/7/92	*98*	*5*	*1*	*141*	*7*	*1*	*69095*	*42398*	*19524*	103	149	131017
23/7/92	*98*	*4*	*0*	*141*	*6*	*0*	*69236*	*42404*	*19524*	102	147	131164
24/7/92	98	4	1	141	6	1	69377	42410	19525	103	148	131312
25/7/92	*118*	*19*	*6*	*170*	*28*	*9*	*69547*	*42438*	*19534*	144	207	131519
26/7/92	*117*	*19*	*6*	*169*	*28*	*8*	*69716*	*42466*	*19542*	142	205	131724
27/7/92	*118*	*20*	*6*	*170*	*29*	*9*	*69886*	*42495*	*19551*	144	208	131932
28/7/92	*117*	*19*	*6*	*169*	*28*	*8*	*70055*	*42523*	*19559*	142	205	132137

Italic values are estimated

FLOW MEASUREMENTS - 1992

Date	DAILY FLOW			DAILY VOLUME			CUMULATIVE DAILY VOLUME					
	Flow 510 (l/m)	Flow 511 (l/m)	Flow 512 (l/m)	Volume 510 (m3)	Volume 511 (m3)	Volume 512 (m3)	Cumulative Volume 510 (m3)	Cumulative Volume 511 (m3)	Cumulative Volume 512 (m3)	Combined Flow 3 stations (l/m)	Combined Volume 3 stations (m3)	Cumulative Volume 3 stations (m3)
29/7/92	118	19	6	170	28	9	70225	42551	19568	144	207	132344
30/7/92	338	8	1	487	12	1	70712	42563	19569	347	500	132844
31/7/92	338	8	1	487	11	1	71199	42574	19570	347	499	133343
1/8/92	68	35	24	98	50	34	71297	42624	19604	126	182	133525
2/8/92	69	34	23	99	49	33	71396	42673	19637	126	181	133706
3/8/92	68	35	24	98	50	34	71494	42723	19671	126	182	133888
4/8/92	68	34	23	98	49	33	71592	42772	19704	125	180	134068
5/8/92	68	35	24	98	50	34	71690	42822	19738	126	182	134250
6/8/92	69	34	23	99	49	33	71789	42871	19771	126	181	134431
7/8/92	68	35	24	98	50	34	71887	42921	19805	126	182	134613
8/8/92	97	3	0	140	4	0	72027	42925	19805	100	144	134757
9/8/92	98	3	1	141	5	1	72168	42930	19806	102	147	134904
10/8/92	97	3	0	140	4	0	72308	42934	19806	100	144	135048
11/8/92	88	4	1	127	6	1	72435	42940	19807	93	134	135182
12/8/92	89	5	1	128	7	2	72563	42947	19809	95	137	135319
13/8/92	88	4	1	127	6	1	72690	42953	19810	93	134	135453
14/8/92	81	2	1	116	3	1	72806	42956	19811	83	120	135573
15/8/92	76	1	1	110	2	1	72916	42958	19812	78	113	135686
16/8/92	77	2	0	111	3	0	73027	42961	19812	79	114	135800
17/8/92	76	1	1	110	2	1	73137	42963	19813	78	113	135913
18/8/92	185	66	48	266	95	69	73403	43058	19882	299	430	136343
19/8/92	185	66	49	266	95	70	73669	43153	19952	299	431	136774
20/8/92	185	66	48	266	95	69	73935	43248	20021	299	430	137204
21/8/92	103	16	13	148	23	19	74083	43271	20040	132	190	137394
22/8/92	103	15	13	148	22	18	74231	43293	20058	131	188	137582
23/8/92	103	16	13	148	23	19	74379	43316	20077	132	190	137772
24/8/92	103	16	13	148	23	19	74527	43339	20096	132	190	137962
25/8/92	103	16	13	148	23	19	74675	43362	20115	132	190	138152
26/8/92	103	15	13	148	22	18	74823	43384	20133	131	188	138340
27/8/92	103	16	13	148	23	19	74971	43407	20152	132	190	138530
28/8/92	273	135	110	393	194	158	75364	43601	20310	517	745	139275
29/8/92	274	135	110	394	194	158	75758	43795	20468	518	746	140021
30/8/92	273	135	110	393	194	158	76151	43989	20626	517	745	140766
31/8/92	274	135	109	394	194	157	76545	44183	20783	517	745	141511
1/9/92	273	135	110	393	194	158	76938	44377	20941	517	745	142256
2/9/92	274	135	110	394	194	158	77332	44571	21099	518	746	143002
3/9/92	273	135	110	393	194	158	77725	44765	21257	517	745	143747
4/9/92	193	38	24	278	54	34	78003	44819	21291	254	366	144113
5/9/92	194	38	24	279	55	34	78282	44874	21325	256	368	144481
6/9/92	193	38	24	278	54	34	78560	44928	21359	254	366	144847
7/9/92	193	38	24	278	55	35	78838	44983	21394	256	368	145215
8/9/92	193	38	24	278	54	34	79116	45037	21428	254	366	145581

Italic values are estimated

FLOW MEASUREMENTS - 1992

Date	DAILY FLOW			DAILY VOLUME			CUMULATIVE DAILY VOLUME					
	Flow 510 (l/m)	Flow 511 (l/m)	Flow 512 (l/m)	Volume 510 (m3)	Volume 511 (m3)	Volume 512 (m3)	Cumulative Volume 510 (m3)	Cumulative Volume 511 (m3)	Cumulative Volume 512 (m3)	Combined Flow 3 stations (l/m)	Combined Volume 3 stations (m3)	Cumulative Volume 3 stations (m3)
9/9/92	*194*	*38*	*24*	*279*	*55*	*34*	*79395*	*45092*	*21462*	256	368	145949
10/9/92	193	38	24	278	54	34	79673	45146	21496	254	366	146315
11/9/92	*218*	*51*	*35*	*314*	*73*	*50*	*79987*	*45219*	*21546*	303	437	146752
12/9/92	*219*	*51*	*34*	*315*	*74*	*49*	*80302*	*45293*	*21595*	304	438	147190
13/9/92	*218*	*51*	*35*	*314*	*73*	*50*	*80616*	*45366*	*21645*	303	437	147627
14/9/92	*219*	*51*	*35*	*315*	*74*	*50*	*80931*	*45440*	*21695*	305	439	148066
15/9/92	*218*	*51*	*34*	*314*	*73*	*49*	*81245*	*45513*	*21744*	303	436	148502
16/9/92	*219*	*51*	*35*	*315*	*74*	*50*	*81560*	*45587*	*21794*	305	439	148941
17/9/92	*218*	*51*	*35*	*314*	*73*	*50*	*81874*	*45660*	*21844*	303	437	149378
18/9/92	*219*	*53*	*35*	*315*	*77*	*50*	*82189*	*45737*	*21894*	307	442	149820
19/9/92	*218*	*49*	*34*	*314*	*70*	*49*	*82503*	*45807*	*21943*	301	433	150253
20/9/92	*218*	*51*	*35*	*314*	*73*	*50*	*82817*	*45880*	*21993*	303	437	150690
21/9/92	*219*	*51*	*35*	*315*	*74*	*50*	*83132*	*45954*	*22043*	305	439	151129
22/9/92	*218*	*51*	*35*	*314*	*73*	*50*	*83446*	*46027*	*22093*	303	437	151566
23/9/92	*219*	*51*	*35*	*315*	*74*	*50*	*83761*	*46101*	*22143*	305	439	152005
24/9/92	*218*	*51*	*34*	*314*	*73*	*49*	*84075*	*46174*	*22192*	303	436	152441
25/9/92	*219*	*51*	*35*	*315*	*74*	*50*	*84390*	*46248*	*22242*	305	439	152880
26/9/92	*218*	*51*	*35*	*314*	*73*	*50*	*84704*	*46321*	*22292*	303	437	153317
27/9/92	*219*	*51*	*35*	*315*	*74*	*50*	*85019*	*46395*	*22342*	305	439	153756
28/9/92	218	51	35	314	73	50	85333	46468	22392	303	437	154193
29/9/92	*194*	*33*	*24*	*280*	*47*	*34*	*85613*	*46515*	*22426*	251	361	154554
30/9/92	*194*	*33*	*24*	*280*	*47*	*35*	*85893*	*46562*	*22461*	251	362	154916
1/10/92	*194*	*33*	*24*	*280*	*47*	*34*	*86173*	*46609*	*22495*	251	361	155277
2/10/92	*194*	*33*	*24*	*280*	*47*	*34*	*86453*	*46656*	*22529*	251	361	155638
3/10/92	*194*	*33*	*24*	*280*	*47*	*35*	*86733*	*46703*	*22564*	251	362	156000
4/10/92	*194*	*33*	*24*	*279*	*47*	*34*	*87012*	*46750*	*22598*	250	360	156360
5/10/92	*194*	*33*	*24*	*280*	*47*	*35*	*87292*	*46797*	*22633*	251	362	156722
6/10/92	*194*	*33*	*24*	*280*	*47*	*34*	*87572*	*46844*	*22667*	251	361	157083
7/10/92	*194*	*33*	*24*	*280*	*47*	*35*	*87852*	*46891*	*22702*	251	362	157445
8/10/92	194	33	24	280	47	34	88132	46938	22736	251	361	157806
9/10/92	*187*	*44*	*11*	*269*	*63*	*16*	*88401*	*47001*	*22752*	242	348	158154
10/10/92	*186*	*44*	*11*	*268*	*63*	*16*	*88669*	*47064*	*22768*	241	347	158501
11/10/92	*187*	*44*	*11*	*269*	*63*	*16*	*88938*	*47127*	*22784*	242	348	158849
12/10/92	*186*	*44*	*11*	*268*	*63*	*16*	*89206*	*47190*	*22800*	241	347	159196
13/10/92	*187*	*44*	*11*	*269*	*63*	*16*	*89475*	*47253*	*22816*	242	348	159544
14/10/92	186	44	11	268	63	16	89743	47316	22832	241	347	159891
15/10/92	*247*	*153*	*94*	*355*	*220*	*136*	*90098*	*47536*	*22968*	494	711	160602
16/10/92	*246*	*152*	*94*	*354*	*219*	*136*	*90452*	*47755*	*23104*	492	709	161311
17/10/92	*247*	*153*	*94*	*355*	*220*	*135*	*90807*	*47975*	*23239*	493	710	162021
18/10/92	*246*	*153*	*94*	*354*	*220*	*136*	*91161*	*48195*	*23375*	493	710	162731
19/10/92	*247*	*152*	*94*	*355*	*219*	*135*	*91516*	*48414*	*23510*	492	709	163440
20/10/92	*246*	*153*	*94*	*354*	*220*	*136*	*91870*	*48634*	*23646*	493	710	164150

Italic values are estimated

FLOW MEASUREMENTS - 1992

Date	DAILY FLOW			DAILY VOLUME			CUMULATIVE DAILY VOLUME					
	Flow 510 (l/m)	Flow 511 (l/m)	Flow 512 (l/m)	Volume 510 (m3)	Volume 511 (m3)	Volume 512 (m3)	Cumulative Volume 510 (m3)	Cumulative Volume 511 (m3)	Cumulative Volume 512 (m3)	Combined Flow 3 stations (l/m)	Combined Volume 3 stations (m3)	Cumulative Volume 3 stations (m3)
21/10/92	*246*	*152*	*94*	*354*	*219*	*135*	*92224*	*48853*	*23781*	492	708	164858
22/10/92	247	153	94	355	220	136	92579	49073	23917	494	711	165569
23/10/92	*201*	*53*	*17*	*290*	*76*	*24*	*92869*	*49149*	*23941*	271	390	165959
24/10/92	*201*	*53*	*17*	*290*	*76*	*24*	*93159*	*49225*	*23965*	271	390	166349
25/10/92	*201*	*53*	*17*	*290*	*76*	*25*	*93449*	*49301*	*23990*	272	391	166740
26/10/92	*201*	*53*	*17*	*290*	*76*	*24*	*93739*	*49377*	*24014*	271	390	167130
27/10/92	*201*	*53*	*17*	*290*	*76*	*24*	*94029*	*49453*	*24038*	271	390	167520
28/10/92	203	53	17	292	76	24	94321	49529	24062	*272*	*392*	167912
29/10/92	*306*	*112*	*143*	*440*	*161*	*206*	*94761*	*49690*	*24268*	*560*	*807*	168719
30/10/92	*199*	*79*	*68*	*287*	*114*	*98*	*95048*	*49804*	*24366*	*347*	*499*	169218
31/10/92	*199*	*78*	*68*	*287*	*113*	*98*	*95335*	*49917*	*24464*	*346*	*498*	169716
1/11/92	*199*	*78*	*68*	*287*	*113*	*98*	*95622*	*50030*	*24562*	*346*	*498*	170214
2/11/92	*199*	*79*	*68*	*286*	*114*	*98*	*95908*	*50144*	*24660*	*346*	*498*	170712
3/11/92	*199*	*78*	*68*	*287*	*113*	*98*	*96195*	*50257*	*24758*	*346*	*498*	171210
4/11/92	*199*	*78*	*68*	*287*	*113*	*98*	*96482*	*50370*	*24856*	*346*	*498*	171708
5/11/92	*199*	*79*	*68*	*287*	*114*	*98*	*96769*	*50484*	*24954*	*347*	*499*	172207
6/11/92	199	78	69	287	113	99	97056	50597	25053	*347*	*499*	172706
7/11/92	*240*	*174*	*133*	*346*	*250*	*192*	*97402*	*50847*	*25245*	*547*	*788*	173494
8/11/92	*241*	*174*	*133*	*347*	*250*	*192*	*97749*	*51097*	*25437*	*548*	*789*	174283
9/11/92	*240*	*174*	*134*	*346*	*250*	*193*	*98095*	*51347*	*25630*	*548*	*789*	175072
10/11/92	*240*	*174*	*133*	*346*	*250*	*192*	*98441*	*51597*	*25822*	*547*	*788*	175860
11/11/92	241	174	133	347	250	192	98788	51847	26014	*548*	*789*	176649
12/11/92	*171*	*87*	*42*	*246*	*125*	*61*	*99034*	*51972*	*26075*	*300*	*432*	177081
13/11/92	*171*	*87*	*42*	*246*	*125*	*61*	*99280*	*52098*	*26136*	*300*	*432*	177514
14/11/92	*171*	*87*	*42*	*246*	*125*	*61*	*99527*	*52223*	*26196*	*300*	*432*	177946
15/11/92	*171*	*87*	*42*	*246*	*125*	*61*	*99773*	*52348*	*26257*	*300*	*432*	178378
16/11/92	*171*	*87*	*42*	*246*	*125*	*61*	*100019*	*52473*	*26318*	*300*	*432*	178811
17/11/92	*171*	*87*	*42*	*246*	*125*	*61*	*100265*	*52599*	*26379*	*300*	*432*	179243
18/11/92	*171*	*87*	*42*	*246*	*125*	*61*	*100512*	*52724*	*26440*	*300*	*432*	179675
19/11/92	*206*	*93*	*52*	*297*	*134*	*75*	*100808*	*52858*	*26515*	*351*	*506*	180181
20/11/92	*206*	*93*	*52*	*297*	*134*	*75*	*101105*	*52992*	*26590*	*351*	*506*	180687
21/11/92	*206*	*93*	*52*	*297*	*134*	*75*	*101402*	*53126*	*26665*	*351*	*506*	181192
22/11/92	*206*	*93*	*52*	*297*	*134*	*75*	*101698*	*53260*	*26740*	*351*	*506*	181698
23/11/92	*206*	*93*	*52*	*297*	*134*	*75*	*101995*	*53394*	*26815*	*351*	*506*	182204
24/11/92	*206*	*93*	*52*	*297*	*134*	*75*	*102292*	*53527*	*26890*	*351*	*506*	182709
25/11/92	*206*	*93*	*52*	*297*	*134*	*75*	*102588*	*53661*	*26966*	*351*	*506*	183215
26/11/92	*206*	*88*	*50*	*297*	*127*	*72*	*102885*	*53788*	*27038*	*344*	*496*	183711
27/11/92	*206*	*88*	*50*	*297*	*127*	*72*	*103181*	*53915*	*27110*	*344*	*496*	184206
28/11/92	*206*	*88*	*50*	*297*	*127*	*72*	*103478*	*54042*	*27183*	*344*	*496*	184702
29/11/92	*206*	*88*	*50*	*297*	*127*	*72*	*103775*	*54168*	*27255*	*344*	*496*	185198
30/11/92	*206*	*88*	*50*	*297*	*127*	*72*	*104071*	*54295*	*27327*	*344*	*496*	185694
1/12/92	*206*	*88*	*50*	*297*	*127*	*72*	*104368*	*54422*	*27400*	*344*	*496*	186189

Italic values are estimated

FLOW MEASUREMENTS - 1992

Date	DAILY FLOW			DAILY VOLUME			CUMULATIVE DAILY VOLUME					
	Flow 510 (l/m)	Flow 511 (l/m)	Flow 512 (l/m)	Volume 510 (m3)	Volume 511 (m3)	Volume 512 (m3)	Cumulative Volume 510 (m3)	Cumulative Volume 511 (m3)	Cumulative Volume 512 (m3)	Combined Flow 3 stations (l/m)	Combined Volume 3 stations (m3)	Cumulative Volume 3 stations (m3)
2/12/92	*206*	*88*	*50*	*297*	*127*	*72*	*104665*	*54548*	*27472*	*344*	*496*	186685
3/12/92	*172*	*73*	*37*	*248*	*105*	*53*	*104912*	*54654*	*27525*	*282*	*406*	187091
4/12/92	*172*	*73*	*37*	*248*	*105*	*53*	*105160*	*54759*	*27579*	*282*	*406*	187497
5/12/92	*172*	*73*	*37*	*248*	*105*	*53*	*105408*	*54864*	*27632*	*282*	*406*	187904
6/12/92	*172*	*73*	*37*	*248*	*105*	*53*	*105655*	*54969*	*27685*	*282*	*406*	188310
7/12/92	*172*	*73*	*37*	*248*	*105*	*53*	*105903*	*55074*	*27739*	*282*	*406*	188716
8/12/92	*172*	*73*	*37*	*248*	*105*	*53*	*106151*	*55179*	*27792*	*282*	*406*	189122
9/12/92	*172*	*73*	*37*	*248*	*105*	*53*	*106398*	*55284*	*27846*	*282*	*406*	189528
10/12/92	*177*	*71*	*37*	*255*	*102*	*54*	*106653*	*55387*	*27899*	*285*	*411*	189939
11/12/92	*177*	*71*	*37*	*255*	*102*	*54*	*106908*	*55489*	*27953*	*285*	*411*	190350
12/12/92	*177*	*71*	*37*	*255*	*102*	*54*	*107163*	*55591*	*28007*	*285*	*411*	190761
13/12/92	*177*	*71*	*37*	*255*	*102*	*54*	*107418*	*55693*	*28061*	*285*	*411*	191172
14/12/92	*177*	*71*	*37*	*255*	*102*	*54*	*107673*	*55795*	*28115*	*285*	*411*	191583
15/12/92	*177*	*71*	*37*	*255*	*102*	*54*	*107928*	*55898*	*28169*	*285*	*411*	191994
16/12/92	*177*	*71*	*37*	*255*	*102*	*54*	*108183*	*56000*	*28222*	*285*	*411*	192405
17/12/92	*175*	*72*	*37*	*252*	*104*	*54*	*108435*	*56104*	*28276*	*284*	*409*	192814
18/12/92	*175*	*72*	*37*	*252*	*104*	*54*	*108687*	*56207*	*28330*	*284*	*409*	193224
19/12/92	*175*	*72*	*37*	*252*	*104*	*54*	*108939*	*56311*	*28384*	*284*	*409*	193633
20/12/92	*175*	*72*	*37*	*252*	*104*	*54*	*109191*	*56415*	*28437*	*284*	*409*	194043
21/12/92	*175*	*72*	*37*	*252*	*104*	*54*	*109443*	*56518*	*28491*	*284*	*409*	194452
22/12/92	*175*	*72*	*37*	*252*	*104*	*54*	*109695*	*56622*	*28545*	*284*	*409*	194862
23/12/92	*175*	*72*	*37*	*252*	*104*	*54*	*109947*	*56726*	*28599*	*284*	*409*	195271
24/12/92	*152*	*34*	*18*	*219*	*49*	*26*	*110165*	*56775*	*28624*	*204*	*293*	195564
25/12/92	*152*	*34*	*18*	*219*	*49*	*26*	*110384*	*56824*	*28650*	*204*	*293*	195858
26/12/92	*152*	*34*	*18*	*219*	*49*	*26*	*110603*	*56873*	*28675*	*204*	*293*	196151
27/12/92	*152*	*34*	*18*	*219*	*49*	*26*	*110822*	*56922*	*28701*	*204*	*293*	196444
28/12/92	*152*	*34*	*18*	*219*	*49*	*26*	*111041*	*56971*	*28726*	*204*	*293*	196738
29/12/92	*152*	*34*	*18*	*219*	*49*	*26*	*111260*	*57019*	*28752*	*204*	*293*	197031
TOTAL							111260	57019	28752			197031

Italic values are estimated

APPENDIX F-2

Iron and sulfate mass balance
Calculations at the ditch montoring stations

MASS BALANCE - 1991

STATION 510	1/1/91	6/1/91	13/1/91	22/1/91	30/1/91	5/2/91	13/2/91	21/2/91	26/2/91	5/3/91	11/3/91	18/3/91	25/3/91	2/4/91
SO4 (mg/l)	*60000*	*60000*	*60000*	77500	58000	71250	85000	75000	75000	85000	61556	60696	62939	53462
Fe (mg/l)	*14500*	*14500*	*14500*	17400	14900	12600	18700	11100	9300	20000	16877	16816	17715	15524
Acidity (mg/l)	*58000*	*58000*	*58000*	47500	50000	53700	58700	60000	53700	57500	61859	53365	61957	54396
Aver. Flow (l/m)	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*150*	*150*	*150*	*150*	850
S (Kg)	20188	20188	20188	26076	19515	23973	28599	25234	25234	42899	31067	30633	31765	152896
Fe (Kg)	14616	14616	14616	17539	15019	12701	18850	11189	9374	30240	25518	25426	26785	133010
Acidity (Kg CaCO3)	58464	58464	58464	47880	50400	54130	59170	60480	54130	86940	93531	80688	93679	466065
Fe/S	0,72	0,72	0,72	0,67	0,77	0,53	0,66	0,44	0,37	0,70	0,82	0,83	0,84	0,87
STATION 511														
SO4 (mg/l)	*62000*	*62000*	*62000*	77500	82500	71250	85000	78750	80000	92500	62173	52125	62190	50623
Fe (mg/l)	*15000*	*15000*	*15000*	16600	16200	8000	18000	9700	8700	15000	14605	12665	15211	13130
Acidity (mg/l)	*61000*	*61000*	*61000*	58750	57500	53800	62750	60000	65000	57500	61269	53365	60484	51549
Aver. Flow (l/m)	*45*	*45*	*45*	*45*	*45*	*45*	*45*	*45*	*45*	*70*	*70*	*70*	*70*	1100
S (Kg)	9387	9387	9387	11734	12491	10788	12870	11923	12113	21786	14643	12277	14647	187359
Fe (Kg)	6804	6804	6804	7530	7348	3629	8165	4400	3946	10584	10305	8936	10733	145585
Acidity (Kg CaCO3)	27670	27670	27670	26649	26082	24404	28463	27216	29484	40572	43231	37654	42678	571575
Fe/S	0,72	0,72	0,72	0,64	0,59	0,34	0,63	0,37	0,33	0,49	0,70	0,73	0,73	0,78
STATION 512														
SO4 (mg/l)	*24810*	*24810*	*24810*	*31388*	*29738*	*28856*	*34425*	*31331*	*31650*	*36338*	*25088*	*22396*	*25299*	*20928*
Fe (mg/l)	*8458*	*8458*	*8458*	*9610*	*8994*	*5411*	*10390*	*5788*	*5070*	*9475*	*8745*	*7987*	*9134*	*7927*
Acidity (mg/l)	*27840*	*27840*	*27840*	*25350*	*25425*	*25000*	*28470*	*27900*	*28248*	*26738*	*28593*	*24815*	*28383*	*24469*
Aver. Flow (l/m)	*20*	*20*	*20*	*20*	*20*	*20*	*20*	*20*	*20*	*35*	*35*	*35*	*35*	*300*
S (Kg)	1670	1670	1670	2112	2001	1942	2317	2108	2130	4279	2954	2637	2979	21124
Fe (Kg)	1705	1705	1705	1937	1813	1091	2095	1167	1022	3343	3085	2818	3222	23971
Acidity (Kg CaCO3)	5613	5613	5613	5111	5126	5040	5740	5625	5695	9433	10088	8755	10013	73993
Fe/S	1,02	1,02	1,02	0,92	0,91	0,56	0,90	0,55	0,48	0,78	1,04	1,07	1,08	1,13
Total (weekly)														
S (Kg)	31244	31244	31244	39922	34007	36702	43785	39266	39477	68964	48664	45547	49391	361380
Fe (Kg)	23125	23125	23125	27006	24181	17420	29109	16756	14343	44167	38909	37180	40740	302566
Combined Flow	165	165	165	165	165	165	165	165	165	255	255	255	255	2250

Italic values are estimated

MASS BALANCE - 1991

STATION 510	9/4/91	15/4/91	22/4/91	29/4/91	7/5/91	13/5/91	20/5/91	27/5/91	3/6/91	10/6/91	16/6/91	23/6/91	30/6/91	7/7/91
SO4 (mg/l)	34097	39730	41347	48627	49051	58886	62918	59997	56170	63577	56540	*64520*	72500	58871
Fe (mg/l)	10582	12240	11233	13693	13578	15960	15976	15947	15549	17209	15797	*15149*	14500	14000
Acidity (mg/l)	34923	43360	42183	51649	52238	62784	61803	63274	59105	65236	61312	*55781*	50250	52500
Aver. Flow (l/m)	1020	850	700	530	337	288	200	330	139	122	140	210	250	173
S (Kg)	117017	113624	97381	86713	55617	57061	42339	66616	26270	26097	26633	45588	60983	34267
Fe (Kg)	108800	104872	79260	73153	46124	46333	32208	53046	21786	21163	22293	32067	36540	24414
Acidity (Kg CaCO3)	359064	371508	297643	275930	177450	182264	124595	210475	82813	80225	86523	118077	126630	91552
Fe/S	0,93	0,92	0,81	0,84	0,83	0,81	0,76	0,80	0,83	0,81	0,84	0,70	0,60	0,71
STATION 511														
SO4 (mg/l)	15061	10851	9629	16731	27035	35471	39874	38105	28270	51232	52301	*62401*	72500	42500
Fe (mg/l)	5087	3519	3876	4883	7496	9351	10777	10211	7810	14072	13782	*13991*	14200	11300
Acidity (mg/l)	19620	14617	15941	21484	28057	37278	40711	38847	29920	55181	52729	*56365*	60000	52500
Aver. Flow (l/m)	340	690	440	190	81	43	33	162	28	18	17	61	97	40
S (Kg)	17229	25191	14255	10696	7368	5132	4427	20770	2663	3103	2992	12807	23662	5720
Fe (Kg)	17434	24475	17191	9352	6120	4053	3585	16674	2204	2553	2362	8603	13884	4556
Acidity (Kg CaCO3)	67242	101664	70702	41146	22908	16158	13542	63436	8445	10012	9036	34658	58666	21168
Fe/S	1,01	0,97	1,21	0,87	0,83	0,79	0,81	0,80	0,83	0,82	0,79	0,67	0,59	0,80
STATION 512														
SO4 (mg/l)	15917	9654	7564	9938	15719	12345	16336	28928	16336	31356	13291	*22146*	31000	26500
Fe (mg/l)	6413	4067	4220	4768	4586	3946	4751	7919	4755	8574	4104	*6042*	7980	5600
Acidity (mg/l)	19963	14617	14224	16284	17756	14224	17658	31147	18639	33746	15451	*22100*	28750	20000
Aver. Flow (l/m)	415	535	390	150	84	21	0,1	53	0,2	4	3,2	25	34	11
S (Kg)	22225	17378	9925	5016	4443	872	5	5159	11	422	143	1863	3546	981
Fe (Kg)	26827	21933	16590	7209	3883	835	5	4231	10	346	132	1523	2735	621
Acidity (Kg CaCO3)	83509	78827	55917	24621	15034	3011	18	16640	38	1361	498	5569	9853	2218
Fe/S	1,21	1,26	1,67	1,44	0,87	0,96	0,87	0,82	0,87	0,82	0,93	0,82	0,77	0,63
Total (weekly)														
S (Kg)	156471	156193	121562	102425	67428	63065	46772	92544	28944	29622	29767	60258	88191	40968
Fe (Kg)	153061	151280	113041	89715	56127	51221	35797	73951	24000	24062	24787	42193	53159	29591
Combined Flow	1775	2075	1530	870	502	352	233	545	167	144	160	296	381	224

Italic values are estimated

MASS BALANCE - 1991

STATION 510	14/7/91	21/7/91	28/7/91	4/8/91	11/8/91	18/8/91	25/8/91	1/9/91	8/9/91	15/9/91	22/9/91	29/9/91	6/10/91	13/10/91
SO4 (mg/l)	71997	73321	98626	124679	60000	60963	61720	57559	58000	51884	55037	*50497*	45957	53082
Fe (mg/l)	17233	17525	21328	26715	15200	14799	14966	14048	17600	12796	13491	*12490*	11488	13060
Acidity (mg/l)	71009	72258	94572	120144	55360	60596	61310	57383	50000	52028	55003	*50719*	46435	53159
Aver. Flow (l/m)	199	148	192	149	130	125	109	167	207	237	181	332	266	242
S (Kg)	48206	36511	62421	62505	26244	25640	22635	32342	40395	41373	33517	56408	41131	43221
Fe (Kg)	34568	26144	41277	40124	19918	18647	16443	23648	36723	30569	24614	41799	30803	31858
Acidity (Kg CaCO3)	142438	107797	183031	180447	72544	76351	67363	96596	104328	124293	100352	169734	124505	129674
Fe/S	0,72	0,72	0,66	0,64	0,76	0,73	0,73	0,73	0,91	0,74	0,73	0,74	0,75	0,74
STATION 511														
SO4 (mg/l)	70547	92236	91449	124679	*101838*	78998	74015	54091	51000	46903	30195	31078	31960	30132
Fe (mg/l)	16913	21698	20315	28715	*22746*	18777	17678	13283	10400	11697	8011	8206	8400	7997
Acidity (mg/l)	69640	90108	89829	120144	*98879*	77613	72913	54111	43000	47328	31560	32393	33226	31501
Aver. Flow (l/m)	45	18	44	28	24	25	21	60	94	114	75	,225	108	62
S (Kg)	10681	5586	13538	11746	8223	6645	5230	10920	16130	17990	7620	23527	11614	6286
Fe (Kg)	7672	3937	9010	7540	5503	4732	3742	8034	9854	13441	6056	18611	9145	4998
Acidity (Kg CaCO3)	31589	16349	39841	33909	23921	19558	15434	32726	40743	54386	23859	73467	36171	19687
Fe/S	0,72	0,70	0,67	0,64	0,67	0,71	0,72	0,74	0,61	0,75	0,79	0,79	0,79	0,80
STATION 512														
SO4 (mg/l)	19035	33852	31117	37284	31000	25491	26979	20611	13250	13424	19981	*18027*	16072	19413
Fe (mg/l)	5549	8818	7718	9117	7200	6973	7301	5898	3500	4311	5757	*5326*	4895	5632
Acidity (mg/l)	21029	35011	33508	39411	26146	27121	28526	22516	9500	15733	21921	*20077*	18232	21386
Aver. Flow (l/m)	22	4	22	10	9	10	10	37	87	72	40	131	71	48
S (Kg)	1409	456	2303	1254	939	858	908	2566	2987	3252	2689	7946	3839	3135
Fe (Kg)	1231	356	1712	919	653	703	736	2199	2364	3129	2321	7033	3503	2725
Acidity (Kg CaCO3)	4663	1412	7431	3973	2372	2734	2875	8398	6416	11418	8839	26511	13048	10347
Fe/S	0,87	0,78	0,74	0,73	0,70	0,82	0,81	0,86	0,79	0,96	0,86	0,89	0,91	0,87
Total (weekly)														
S (Kg)	60296	42553	78262	75505	35406	33142	28773	45827	59512	62615	43826	87880	56584	52642
Fe (Kg)	43470	30437	51999	48583	26074	24081	20921	33880	48941	47139	32992	67443	43450	39581
Combined Flow	266	170	258	187	163	160	140	264	368	423	296	688	445	352

Italic values are estimated

MASS BALANCE - 1991

STATION 510	20/10/91	27/10/91	3/11/91	10/11/91	17/11/91	24/11/91	1/12/91	8/12/91	15/12/91	22/12/91	Weekly Average	Total 1991 52 weeks
SO4 (mg/l)	58000	48984	55000	56234	53649	51190	37446	58252	56550	60081	60941	
Fe (mg/l)	14000	12156	14700	13756	13185	12643	9610	14201	13825	14604	14832	
Acidity (mg/l)	25000	49291	55182	56134	53694	51374	38403	58038	56431	59763	56661	
Aver. Flow (l/m)	246	222	186	172	196	206	182	176	176	159	235	
S (Kg)	48006	36588	34420	32543	35379	35480	22930	34495	33487	32142	43705	2272678
Fe (Kg)	34716	27202	27561	23850	26049	26253	17630	25194	24527	23406	33559	1745080
Acidity (Kg CaCO3)	61992	110301	103460	97323	106082	106677	70453	102964	100113	95783	125805	6541835
Fe/S	0,72	0,74	0,80	0,73	0,74	0,74	0,77	0,73	0,73	0,73	0,74	
STATION 511												
SO4 (mg/l)	37000	17963	32000	31645	28808	21998	22251	38580	34924	50623	52067	
Fe (mg/l)	7200	5312	7427	8331	7705	6202	6258	9861	9054	12518	11844	
Acidity (mg/l)	15000	20017	29061	32929	30251	23825	24063	39474	36023	50838	48884	
Aver. Flow (l/m)	95	65	99	96	91	89	77	72	72	45	111	
S (Kg)	11827	3928	10659	10221	8820	6587	5765	9346	8460	7665	14343	745819
Fe (Kg)	6895	3480	7412	8062	7068	5564	4857	7157	6571	5678	10570	549638
Acidity (Kg CaCO3)	14364	13115	29001	31865	27749	21374	18677	28649	26144	23060	42605	2215436
Fe/S	0,58	0,89	0,70	0,79	0,80	0,84	0,84	0,77	0,78	0,74	0,73	
STATION 512												
SO4 (mg/l)	26500	13424	28000	27231	22377	15126	*20927*	26727	24583	*30237*	23261	
Fe (mg/l)	6400	4311	6900	7357	6286	4686	*5966*	7246	6773	*8331*	6613	
Acidity (mg/l)	12000	15733	42548	28764	24182	17340	*22814*	28288	26265	*32306*	24074	
Aver. Flow (l/m)	62	45	50	46	49	51	41	37	37	23	64	
S (Kg)	5528	2032	4710	4215	3689	2596	2887	3327	3060	2340	3702	192507
Fe (Kg)	4000	1955	3478	3411	3105	2409	2466	2702	2526	1931	3752	195123
Acidity (Kg CaCO3)	7500	7136	21444	13337	11944	8914	9429	10550	9796	7490	13010	676546
Fe/S	0,72	0,96	0,74	0,81	0,84	0,93	0,85	0,81	0,83	0,83	0,89	
Total (weekly)												
S (Kg)	65361	42549	49789	46979	47889	44663	31582	47168	45008	42146	61750	3211004
Fe (Kg)	45610	32638	38450	35323	36222	34226	24953	35053	33624	31016	47882	2489842
Combined Flow	403	332	335	314	336	346	300	285	285	227	411	

Italic values are estimated

MASS BALANCE - 1992

STATION 510	1/1/92	8/1/92	14/1/92	21/1/92	28/1/92	4/2/92	11/2/92	18/2/92	25/2/92	3/3/92	10/3/92	17/3/92	24/3/92	31/3/92
SO4 (mg/l)	57236	60267	58686	*63184*	67682	*68070*	*68458*	*68846*	*69235*	*69623*	*70011*	*70400*	*70788*	71177
Fe (mg/l)	14465	15117	14778	*15726*	16674	*16753*	*16832*	*16911*	*16991*	*17070*	*17149*	*17229*	*17308*	17388
Acidity (mg/l)	58794	61689	60181	*64437*	68693	*69055*	*69418*	*69781*	*70144*	*70506*	*70869*	*71232*	*71595*	71958
Aver. Flow (l/m)	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*100*	*114*	*150*	*150*	*150*	*150*	*150*
S (Kg)	19258	20277	19745	21259	22772	22903	23033	23164	26556	35138	35334	35530	35726	35922
Fe (Kg)	14581	15238	14896	15852	16807	16887	16967	17046	19525	25810	25929	26050	26170	26291
Acidity (Kg CaCO3)	59264	62183	60662	64952	69243	69607	69973	70339	80604	106605	107154	107703	108252	108800
Fe/S	0,76	0,75	0,75	0,75	0,74	0,74	0,74	0,74	0,74	0,73	0,73	0,73	0,73	0,73
STATION 511														
SO4 (mg/l)	60901	*62984*	*65066*	*67149*	69232	*67537*	*65842*	*64147*	*62452*	*60757*	59062	*57367*	*55672*	53977
Fe (mg/l)	15253	*15687*	*16122*	*16557*	16992	*16632*	*16272*	*15912*	*15552*	*15192*	*14832*	*14472*	*14112*	13752
Acidity (mg/l)	62292	*64255*	*66218*	*68181*	70144	*68534*	*66925*	*65316*	*63706*	*62097*	*60488*	*58878*	*57269*	55660
Aver. Flow (l/m)	*45*	*45*	*45*	*45*	*45*	*45*	*45*	*45*	*52*	*70*	*70*	*70*	*70*	*70*
S (Kg)	9221	9536	9851	10167	10482	10226	9969	9712	10927	14310	13910	13511	13112	12713
Fe (Kg)	6919	7116	7313	7510	7708	7544	7381	7218	8152	10719	10465	10211	9957	9703
Acidity (Kg CaCO3)	28256	29146	30036	30927	31817	31087	30357	29627	33392	43816	42680	41544	40409	39274
Fe/S	0,75	0,75	0,74	0,74	0,74	0,74	0,74	0,74	0,75	0,75	0,75	0,76	0,76	0,76
STATION 512														
SO4 (mg/l)	*24115*	*25101*	*25395*	*26601*	*27806*	*27432*	*27058*	*26684*	*26311*	*25936*	*25562*	*25189*	*24815*	*24441*
Fe (mg/l)	*8548*	*8836*	*8941*	*9284*	*9627*	*9503*	*9379*	*9255*	*9131*	*9007*	*8883*	*8759*	*8635*	*8511*
Acidity (mg/l)	*28354*	*29430*	*29735*	*31049*	*32363*	*31959*	*31556*	*31153*	*30750*	*30347*	*29944*	*29540*	*29137*	*28734*
Aver. Flow (l/m)	*11*	*11*	*11*	*11*	*11*	*11*	*11*	*11*	*16*	*31*	*31*	*31*	*31*	*31*
S (Kg)	893	929	940	985	1029	1015	1001	988	1416	2705	2666	2627	2588	2549
Fe (Kg)	948	980	991	1029	1067	1054	1040	1026	1473	2814	2776	2737	2698	2660
Acidity (Kg CaCO3)	3144	3263	3297	3443	3588	3544	3499	3454	4959	9483	9357	9231	9105	8979
Fe/S	1,06	1,05	1,05	1,05	1,04	1,04	1,04	1,04	1,04	1,04	1,04	1,04	1,04	1,04
Total (weekly)														
S (Kg)	29371	30743	30537	32410	34284	34144	34004	33864	38899	52153	51910	51669	51426	51184
Fe (Kg)	22447	23333	23201	24391	25582	25485	25388	25290	29149	39344	39170	38999	38825	38654
Combined Flow	156	156	156	156	156	156	156	156	182	251	251	251	251	251

Italic values are estimated

MASS BALANCE - 1992

STATION 510	7/4/92	14/4/92	21/4/92	28/4/92	5/5/92	12/5/92	19/5/92	26/5/92	2/6/92	9/6/92	16/6/92	23/6/92	30/6/92	7/7/92
SO4 (mg/l)	52730	71177	12031	50248	52730	30347	57110	58370	77722	58370	64726	58370	71177	53353
Fe (mg/l)	13476	17388	3425	12922	13476	8217	14437	14710	13700	13100	15300	14200	15800	15400
Acidity (mg/l)	54455	71958	13100	52046	54455	32228	58673	59879	78010	59879	65914	59879	71958	55057
Aver. Flow (l/m)	119	175	610	1236	769	438	410	216	182	182	182	182	157	172
S (Kg)	21112	41909	24692	208964	136432	44722	78782	42421	47594	35743	39635	35743	37599	30876
Fe (Kg)	16165	30672	21060	169994	104459	36278	59665	32028	25133	24033	28069	26051	25004	26700
Acidity (Kg CaCO3)	65320	126934	80549	648435	422109	142288	242484	130373	143114	109852	120923	109852	113878	95456
Fe/S	0,77	0,73	0,85	0,77	0,77	0,81	0,76	0,76	0,53	0,67	0,71	0,73	0,67	0,86
STATION 511														
SO4 (mg/l)	53353	42286	5959	19926	21069	9257	23942	41680	52108	36269	53977	28005	47167	27422
Fe (mg/l)	13614	11097	1726	5549	5849	2655	6595	10955	7810	7050	11400	5660	9900	5830
Acidity (mg/l)	55057	44228	6545	21458	22653	10119	25643	43627	53852	38224	55660	29832	49037	29234
Aver. Flow (l/m)	44	170	1160	1098	490	97	171	36	32	32	32	32	20	49
S (Kg)	7899	24187	23258	73613	34735	3021	13775	5049	5610	3905	5812	3015	3174	4521
Fe (Kg)	6038	19016	20182	61415	28889	2596	11368	3975	2519	2274	3677	1826	1996	2880
Acidity (Kg CaCO3)	24419	75789	76529	237494	111888	9894	44200	15831	17371	12330	17954	9623	9886	14439
Fe/S	0,76	0,79	0,87	0,83	0,83	0,86	0,83	0,79	0,45	0,58	0,63	0,61	0,63	0,64
STATION 512														
SO4 (mg/l)	9257	21069	21412	14830	22215	9257	14830	30935	50248	36867	39868	23942	32114	19928
Fe (mg/l)	2656	5849	5939	4189	6148	2656	4189	8363	9380	9410	11100	6560	9000	5710
Acidity (mg/l)	10119	22653	23012	16083	23849	10119	16083	32827	52046	38824	41825	25643	34026	21458
Aver. Flow (l/m)	42	24	344	822	279	48	85	6	5	5	5	5	2	16
S (Kg)	1308	1701	24783	41015	20854	1495	4241	625	845	620	671	403	216	1073
Fe (Kg)	1124	1415	20594	34709	17290	1285	3589	506	473	474	559	331	181	921
Acidity (Kg CaCO3)	4284	5480	79795	133260	67071	4896	13780	1985	2623	1957	2108	1292	686	3461
Fe/S	0,86	0,83	0,83	0,85	0,83	0,86	0,85	0,81	0,56	0,76	0,83	0,82	0,84	0,86
Total (weekly)														
S (Kg)	30319	67797	72733	323592	192022	49238	96799	48094	54049	40268	46118	39161	40989	36470
Fe (Kg)	23327	51103	61835	257118	150639	40159	74622	36509	28125	26781	32305	28207	27182	30500
Combined Flow	205	369	2114	3156	1538	583	666	258	219	219	219	219	179	237

Italic values are estimated

MASS BALANCE - 1992

STATION 510	14/7/92	21/7/92	28/7/92	4/8/92	11/8/92	18/8/92	25/8/92	1/9/92	8/9/92	15/9/92	22/9/92	29/9/92	6/10/92	13/10/92
SO4 (mg/l)	64726	58370	64726	64726	63447	64726	63447	53166	55227	55866	58370	46553	58370	53353
Fe (mg/l)	15600	14400	14100	14700	14400	16400	15100	13500	13900	13300	14100	12700	15100	14000
Acidity (mg/l)	65914	59879	65914	65914	64706	65914	64706	54876	56865	57287	59879	48436	59879	55057
Aver. Flow (l/m)	129	118	109	152	84	96	126	225	216	211	218	215	194	189
S (Kg)	28093	23174	23738	33102	17932	20907	26898	40249	40136	39519	42813	33676	38100	33928
Fe (Kg)	20285	17128	15492	22523	12193	15870	19178	30618	30264	28288	30984	27523	29528	26672
Acidity (Kg CaCO3)	85709	71222	72421	100991	54788	63784	82182	124459	123811	121843	131581	104970	117095	104890
Fe/S	0,72	0,74	0,65	0,68	0,68	0,76	0,71	0,76	0,75	0,72	0,72	0,82	0,78	0,79
STATION 511														
SO4 (mg/l)	55854	49013	55854	53353	67940	77722	60267	39687	50867	45451	43500	26839	45941	32114
Fe (mg/l)	12500	9840	10700	9540	12700	15000	11400	8220	10600	8000	9160	6030	9950	7179
Acidity (mg/l)	57467	50842	57467	55057	68935	78010	61689	41645	52648	47353	45430	28635	47835	34026
Aver. Flow (l/m)	19	7	13	25	17	12	30	101	65	47	51	48	33	41
S (Kg)	3571	1154	2443	4488	3886	3138	6083	13487	11125	7187	7464	4335	5101	4430
Fe (Kg)	2394	694	1402	2404	2176	1814	3447	8369	6945	3790	4709	2918	3310	2967
Acidity (Kg CaCO3)	11006	3587	7530	13874	11813	9436	18655	42398	34495	22434	23355	13855	15912	14062
Fe/S	0,67	0,60	0,57	0,54	0,56	0,58	0,57	0,62	0,62	0,53	0,63	0,67	0,65	0,67
STATION 512														
SO4 (mg/l)	26839	27422	36269	32705	30347	33889	23769	23885	28589	18219	28589	13708	6505	19356
Fe (mg/l)	9220	7270	8200	7090	8300	9620	6800	6160	8750	4700	8240	4490	2010	5780
Acidity (mg/l)	28635	29234	38224	34625	32228	35824	25463	25583	30431	19665	30431	14889	7140	20860
Aver. Flow (l/m)	3	1	4	14	10	7	23	82	48	31	35	33	24	15
S (Kg)	271	92	488	1541	1021	798	1839	6590	4617	1900	3367	1522	525	977
Fe (Kg)	279	73	331	1001	837	679	1577	5092	4234	1469	2907	1494	486	874
Acidity (Kg CaCO3)	866	295	1541	4886	3249	2528	5903	21146	14724	6145	10736	4953	1727	3154
Fe/S	1,03	0,79	0,68	0,65	0,82	0,85	0,86	0,77	0,92	0,77	0,86	0,98	0,93	0,89
Total (weekly)														
S (Kg)	31935	24421	26669	39130	22839	24843	34820	60325	55878	48607	53644	39532	43726	39335
Fe (Kg)	22958	17896	17225	25927	15206	18363	24202	44078	41443	33546	38600	31935	33324	30513
Combined Flow	151	126	126	191	111	115	179	408	329	289	304	296	251	245

Italic values are estimated

MASS BALANCE - 1992

STATION 510	20/10/92	27/10/92	3/11/92	10/11/92	17/11/92	24/11/92	1/12/92	8/12/92	15/12/92	22/12/92	29/12/92	Weekly Average	Total 1991 52 weeks
SO4 (mg/l)	55854	53353	53977	57110	49630	56230	58370	58370	65367	58370	64724	59592	
Fe (mg/l)	13400	14000	12500	15000	14200	14100	15700	17000	15900	16300	15900	14740	
Acidity (mg/l)	57467	55057	55660	58673	51444	57829	59879	59879	66518	59879	65914	60930	
Aver. Flow (l/m)	238	214	215	223	181	*201*	*206*	*177*	*176*	*175*	*175*	211	
S (Kg)	44726	38415	39046	42850	30224	38027	40457	34761	38708	34369	38110	38959	2064802
Fe (Kg)	32147	30200	27090	33718	25908	28568	32601	30331	28208	28753	28048	29179	1546475
Acidity (Kg CaCO3)	137866	118765	120626	131888	93859	117166	124338	106834	118008	105627	116272	119772	6347900
Fe/S	0,72	0,79	0,69	0,79	0,86	0,75	0,81	0,87	0,73	0,84	0,74	0,75	
STATION 511													
SO4 (mg/l)	27422	36867	28005	32705	34483	34067	47781	39266	53977	53977	71177	47145	
Fe (mg/l)	6250	8090	5400	7520	7970	7780	10900	10300	11300	13000	14400	10694	
Acidity (mg/l)	29234	38824	29832	34625	36424	36004	49639	41225	55660	55660	71958	48703	
Aver. Flow (l/m)	137	81	80	133	99	*92*	*89*	*75*	*71*	*72*	*72*	108	
S (Kg)	12640	10047	7538	14635	11486	10545	14308	9909	12894	13076	17243	10970	581433
Fe (Kg)	8631	6605	4355	10082	7953	7215	9779	7787	8087	9435	10451	8005	424287
Acidity (Kg CaCO3)	40371	31699	24057	46420	36348	33389	44532	31166	39835	40396	52224	34394	1822863
Fe/S	0,68	0,66	0,58	0,69	0,69	0,68	0,68	0,79	0,63	0,72	0,61	0,69	
STATION 512													
SO4 (mg/l)	21069	23366	18219	14830	20497	18673	33889	35077	38064	22790	*22790*	25067	
Fe (mg/l)	6670	7310	4850	4820	6710	5900	10800	12800	11500	9530	*9530*	7632	
Acidity (mg/l)	22853	25045	19665	18083	22055	20143	35824	37024	40024	24447	*24447*	27420	
Aver. Flow (l/m)	82	39	71	108	55	*51*	*51*	*39*	*37*	*37*	*37*	54	
S (Kg)	5813	3066	4352	5289	3793	3204	5815	4603	4739	2837	2837	3662	194079
Fe (Kg)	5513	2874	3471	5150	3720	3033	5552	5032	4289	3554	3554	3280	173818
Acidity (Kg CaCO3)	18724	9846	14074	17184	12227	10355	18416	14555	14927	9118	9118	11914	631420
Fe/S	0,95	0,94	0,80	0,97	0,98	0,95	0,95	1,09	0,91	1,25	1,25	0,92	
Total (weekly)													
S (Kg)	63179	51529	50937	62774	45503	51777	60580	49273	56341	50282	58190	53591	2840314
Fe (Kg)	46291	39679	34916	48949	37581	38816	47931	43149	40584	41742	42053	40464	2144580
Combined Flow	457	334	366	462	335	344	346	291	284	284	284	373	

Italic values are estimated

APPENDIX G

Data from monitoring stations prior to 1991

HISTORICAL DATA FROM 1986 TO 1990
Sampling point : STATION D-301 (EAST)

Date (m/d/y)	Acidity (mg/l)	Fe (mg/l)	SO4 (mg/l)	pH
04/30/86	23000	9365	34000	2.34
05/27/86	33750	10050	46600	2.29
06/17/86	40450	10800	46000	2.30
07/29/86	42750	11300	57000	2.27
08/26/86	40000	9860	9000	2.36
09/30/86	43750	12290	58000	2.26
11/19/86	41700	100	50000	2.35
04/13/87	26000	1026	58000	2.16
05/05/87	35500	974	40000	2.44
06/02/87	15625	3960	18000	2.51
07/21/87	48168	14869	41630	2.37
08/18/87	58350	13200	75000	2.36
09/17/87	30535	839	33900	2.38
10/21/87	53400	11900	70000	2.36
11/20/87	56500	2000	85000	2.35
01/12/88	525	80	1500	3.16
04/26/88		6300		2.47
05/09/88	62500	22500	56000	2.43
05/10/88	48750	18700	60000	2.56
05/11/88	46900	14700	41000	2.51
05/12/88	61250	16000	46000	2.52
05/13/88	27500	8050	30000	2.61
06/22/88	46250	21500	85000	2.54
07/20/88	53750	19000	55000	2.58
08/22/88	61250	1717	76000	2.55
10/27/88	15000	3200	28000	2.79
04/25/89	25750	7400	30000	2.49
06/06/89	12870	3570	19000	2.64
07/10/89	45000	14000	49000	2.31
10/31/89	42840	11500	50000	2.38
11/22/89	22050	5770	22000	2.78

HISTORICAL DATA FROM 1986 TO 1990
Sampling point : STATION D-302

Date (m/d/y)	Acidity (mg/l)	Fe (mg/l)	SO4 (mg/l)	pH
04/30/86	32	2	200	4.16
05/27/86	155	6	500	3.19
06/17/86	650	88	1200	2.89
07/29/86	1300	145	2400	2.68
08/26/86	83	74	1900	2.94
09/30/86	800	96	1500	2.81
11/19/86	468	60	1100	3.12
02/03/87	1650	183	4000	3.20
04/13/87	101	14	220	3.60
05/05/87	217	25	500	3.15
06/02/87	251	30	500	2.87
07/21/87	952	124	1200	2.73
08/18/87	1070	103	1650	2.86
09/17/87	2822	776	1500	2.74
10/21/87	1403	3	1750	2.67
11/20/87	1085	1	1700	2.86
12/08/87	1484	235	2100	2.93
01/12/88	525	80	1500	3.16
04/26/88		3300		2.63
05/09/88	235	39	800	3.04
05/10/88	300	52	750	3.03
05/11/88	312	42	900	3.25
05/12/88	288	44	900	3.25
05/13/88	275	43	900	3.29
06/22/88	1188	239	2050	2.68
07/20/88	1465	261	2450	2.58
08/22/88	1250	203	1750	3.10
09/06/88	13500	2319	11500	2.51
10/27/88	1000	201	1550	2.81
11/23/88	750	323	1900	3.07
12/13/88	5150	1820	7880	2.60
01/17/89	6750	2430	9750	2.82
07/02/89	1357	430	3000	2.74
03/14/89	15000	3210	21000	2.72
04/25/89	4050	1180	3830	2.71
05/16/89	3600	960	6000	2.79
06/06/89	3000	800	4500	2.85
07/10/89	35750	11500	39000	2.31
10/31/89	20475	6630	23500	2.41
11/22/89	9135	2480	9500	2.74
04/10/90	2200	162	2040	2.79
05/08/90	2900	1130	4100	2.69
06/12/90	28750	10750	77500	2.36
07/09/90	3750	1442	7000	2.61
08/27/90	21250	9475	32000	2.37
09/17/90	5600	1633	6500	2.63
10/09/90	6700	822	6000	2.58
11/19/90	11950	3570	15500	2.43

HISTORICAL DATA FROM 1986 TO 1989
Sampling point : STATION D-309 (SOUTH)

Date (m/d/y)	Acidity (mg/l)	Fe (mg/l)	SO4 (mg/l)	pH
06/17/86	13750	1850	12000	2.62
07/29/86	16400	1030	18250	2.80
08/26/86	14000	1600	16000	2.62
09/30/86	9000	1093	10000	2.72
11/19/86	8700	930	10000	2.90
04/13/87	8000	84	12000	2.65
05/05/87	7470	1054	9000	2.83
06/02/87	2875	477	4000	2.75
07/21/87	5019	672	9050	2.87
08/18/87	15302	1580	18500	2.81
09/17/87	4060	844	5500	2.57
10/21/87	857	921	10000	2.66
04/26/88		3000		2.63
05/09/88	26250	11050	34000	2.63
05/10/88	30000	9300	22000	2.60
05/11/88	17500	4770	20000	2.75
05/12/88	21250	6340	26500	2.71
05/13/88	10000	3430	16000	2.80
06/22/88	20695	8910	35000	2.66
07/20/88	16383	4740	29000	2.81
08/22/88	52500	883	58000	2.59
09/06/88	27750	653	42000	2.43
10/27/88	55000	1400	68000	2.52
11/23/88	12000	4540	32000	2.69
04/25/89	41250	13000	57000	2.31
05/16/89	43000	1130	70000	2.61
06/06/89	40125	10100	57000	2.41
07/10/89	53750	17500	77500	2.21
10/31/89	47250	12700	60000	2.27
11/22/89	37800	11900	50000	2.29