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A STUDY OF THE CHEMICAL AND PHYSICAL PROPERTIES OF SYNCRUDE'S TAILINGS POND, MILDRED LAKE, 1980

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A Study of the Chemical and Physical Properties of Syncrude's Tailings Pond, Mildred Lake, 1980

by

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Edmonton, Alberta

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FOREWORD

Syncrude Canada Ltd. is producing synthetic crude oil from a surface mine in the Athabasca Tar Sands area of north-eastern Alberta. This report describes the chemical and physical properties in the tailings pond at the Mildred Lake site of Syncrude Canada Ltd. during the ice-free period of 1980.

Syncrude's Environmental Research Monographs are published verbatim from the final reports of professional environmental consultants. Only proprietary technical or budget-related information is withheld. Because we do not necessarily base our decisions on just one consultant's opinion, recommendations found in the text should not be construed as committments to action by Syncrude.

Syncrude Canada Ltd. welcomes public and scientific interest in its environmental activities. Please address any questions or comments to Syncrude Environmental Affairs, 10030-107 Street, Edmonton, Alberta, T5J 3E5.

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THE SYNCRUDE TAILINGS POND, MILDRED LAKE, 1980

SUMMARY

Selected chemical and physical properties of the tailings pond were examined in 1980. The distributions of specific variables with depth and season within the tailings pond were determined (temperature, pH, conductivity, suspended particulate matter, total solids, bitumen, major anions, major cations, organic carbon, nutrients, phenols, and trace metals). From the resulting information, a generalized picture of the present state of the tailings pond was obtained.

In 1980, the tailings pond was a highly stratified waterbody with a low density, well mixed surface zone (0-6 m) overlying a high density deep water zone (>10 m) where mixing is slow. Between these two zones, lies a zone of rapidly changing values in which a thermocline (zone of rapid temperature change) and a pycnocline (zone of rapidly increasing density) are established. The exact depth at which these changes begin varies with season (shallowest in spring and early summer, deepening during summer and fall). In the surface zone (0-6 m), most concentrations were generally low and uniform, while in the deep zone (>10 m), the concentrations of variables, particularly those associated with the particulate fraction (fines, bitumen), were high. In the deepest waters (>15 m), a sludge zone of high fines (>4%) and high bitumen (>5000 mg ℓ^{-1}) concentration was evident. Throughout this tailings pond study, the concentrations of most dissolved variables (nutrients, trace metals, phenols, organic carbon) were generally higher than in surrounding waters. While the concentrations are high, I would not consider the

levels to be high enough to be considered excessive, at present.

External influences such as seasonal changes and rate of tailings disposal have significant effects on conditions within the well mixed surface zone (0-6 m). Active mixing by wind and thermal processes within the surface zone resulted in uniform distributions with depth and area. However, these effects are only slowly transferred to the high density deeper waters (>10 m). The mixing processes between zones and within the deeper zone (>10 m) are slow and appear to be by diffusive rather than advective processes.

The quality of the tailings pond waters during the 1980 study was acceptable for maintenance of maximum rate of recycle of water from the tailings pond for plant processes. The layer of potential reclaim water of high quality (<1.0% SPM, <400 ppm bitumen, low Cl) varied during the study. The optimum periods for such reclaim were in late summer and fall but at no time was the quality of this water limiting. At the rate of reclaim during 1980, about a 10 fold reserve of reclaim water was available.

During the period of the study, steady increases in concentrations of certain variables such as sodium, chloride and boron were measured. Most of this observed change in concentrations of these conservative species could be explained by calculating the amount of its input into the pond during the study. For example, the chloride inputs into the pond were known (D. Heaton, pers. comm.) and were used to calculate a mass balance. This calculated input (≃17 mg L^{-1}) compared closely to the measured chloride concentration increases (≃14-15 mg L^{-1}). At such a rate of chloride concentration increase (≃15 mg L^{-1} per year), high chloride concentrations may prove to be detrimental to maximum reclaim in the future.

Of the variables examined, only sodium, chloride, and boron could be characterized as conservative species (little chemical, physical or biological interactions). Their concentrations will continually increase in tailings pond waters with input from process activities. These species may play an important role in future studies as tracer properties (absolute concentrations or ratios of concentrations). Such tracers will be needed to determine the rate, amount, and significance of potential tailings pond water intrusion into the surrounding aquatic environment.

The tailings pond is an environmental hazard both physically and chemically. The tailings waters are accutely toxic (LC50<4% for rainbow trout by 96 hour static bioassay). However, the quality of these waste waters in the tailings pond at this stage of its development has not deteriorated to a level where it cannot be reclaimed. Methods for reclamation are under development and preliminary results have been encouraging (Nix and Salahub, 1981). A better understanding of the absolute concentrations, distributions, interactions, composition and steady-state conditions of the properties within this waterbody must be obtained so that reclamation options and the optimum period of their implementation can be recommended.

ACKNOWLEDGEMENTS

The successful complethion of this study during 1980 would not have been possible without the support of many. Andrew Walker provided high quality technical assistance and had significant input to the success of the 1980 program. I thank Frank Ryan for maintaining a high level of field support which ensured few problems during the field program. Scientific supervision was provided by Dr. M. Aleksiuk. Data handling and manipulation were facilitated through the invaluable aid of Luca Vanzella. Special thanks go to Dr. J. Liu, Gord Thompson, Sherry Court and Ron Regush at the Research Lab in Edmonton who provided advice, lab space, equipment and ICP analysis. Aurel Langevin and Jim McKay of Operations provided on site support through equipment and lab facilities in the Environmental Complex on site. I would also like to thank Sherry Langlais for her patience and high level of skill in the preparation of this manuscript.

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INTRODUCTION

All process waters produced at the Mildred Lake site of the Syncrude oil sands project are retained in a tailings pond on the site (Fig. 1). Tailings from extraction and upgrading processes are transported as a slurry by pipeline to this pond area. The tailings slurry is a mixture of water:sand:bitumen (50:50:1 by weight) and includes process chemicals (e.g. NaOH, Naphtha), by-products of upgrading procedures, and waste products from laboratory and service operations.

Under the "Conditions to Development and Reclamation Approval No. OS-1-78", Syncrude is required to conduct research into "the problem of reclaiming the tailings sludge disposal area", including the reduction of "the toxicity of accumulated tailings pond water so that the tailings pond may eventually be either safely drained and the land reclaimed, or safely reclaimed as a viable waterbody". To ensure that these conditions are met and before options for eventual reclamation can be developed, it is necessary to understand the structure and composition of the tailings pond.

In this report, results from the first phase of a program designed to determine the physical and chemical charactertistics of the tailings pond are presented. The influence of seasonal changes on variable distributions are discussed. The present state of the tailings pond with respect to the variables studied is described. Depth profiles of an array of variable values at various locations throughout the pond during

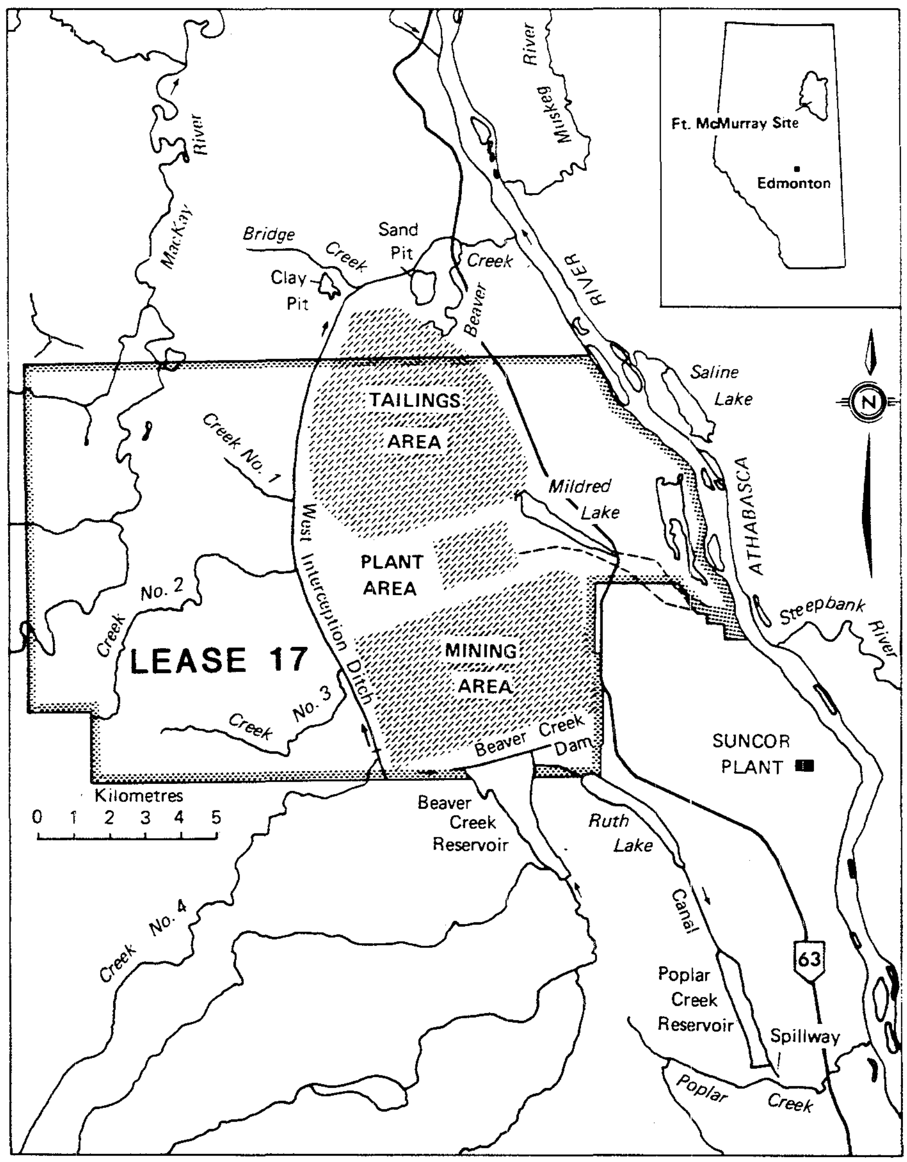

Figure 1. Location of the Syncrude site on Lease 17.

the ice free period of April to November, 1980 are presented (temperature, pH, condictivity, major anions, major cations, trace elements, nutrients, dissolved organic carbon, phenols, suspended particulate matter, total solids, dissolved solids, and suspended bitumen). The vertical and areal distributions and seasonal trends have been examined and a picture of the present physical and chemical characteristics of the tailings pond will be presented.

DESCRIPTION OF STUDY AREA

Under license requirements, all process-affected waters produced at Syncrude's Mildred Lake oil sands project are retained on site. This has led to the formation of the tailings pond which is designed to ultimately reach an area of about 30 km^2 and an elevation of 345-350 m (average depth of about 30 m). During the present study, the pond was about 15 km^2 with a water level elevation of about 306-308 m. The deepest parts of the pond (23-25 m) were in the remnants of Beaver Creek valley which run through the centre of the pond (Fig. 2). The plant has been in operation since mid 1978. The present volume of the pond is estimated at 130 x $10^6 m^3$, with its ultimate volume proposed at greater than $10^9 m^3$. At the present rate of extraction and upgrading, the pond is growing at a rate of about 3 x $10^6 m^3$ per month of process waters (Water Management Report, 1980).

The water used in the plant is obtained from two sources:

- Raw Water - taken from Mildred Lake and, originating from the Athabasca River;
- Recycle Water - taken from the low solids zone of the pond. Under plant specification, water with solids of less than 2.9% require no raw water makeup for extraction process (Schock *et al.*, 1979).

Under present conditions, the recycle system is running at more than 90% capacity. This means that about 50-65% of the water require-

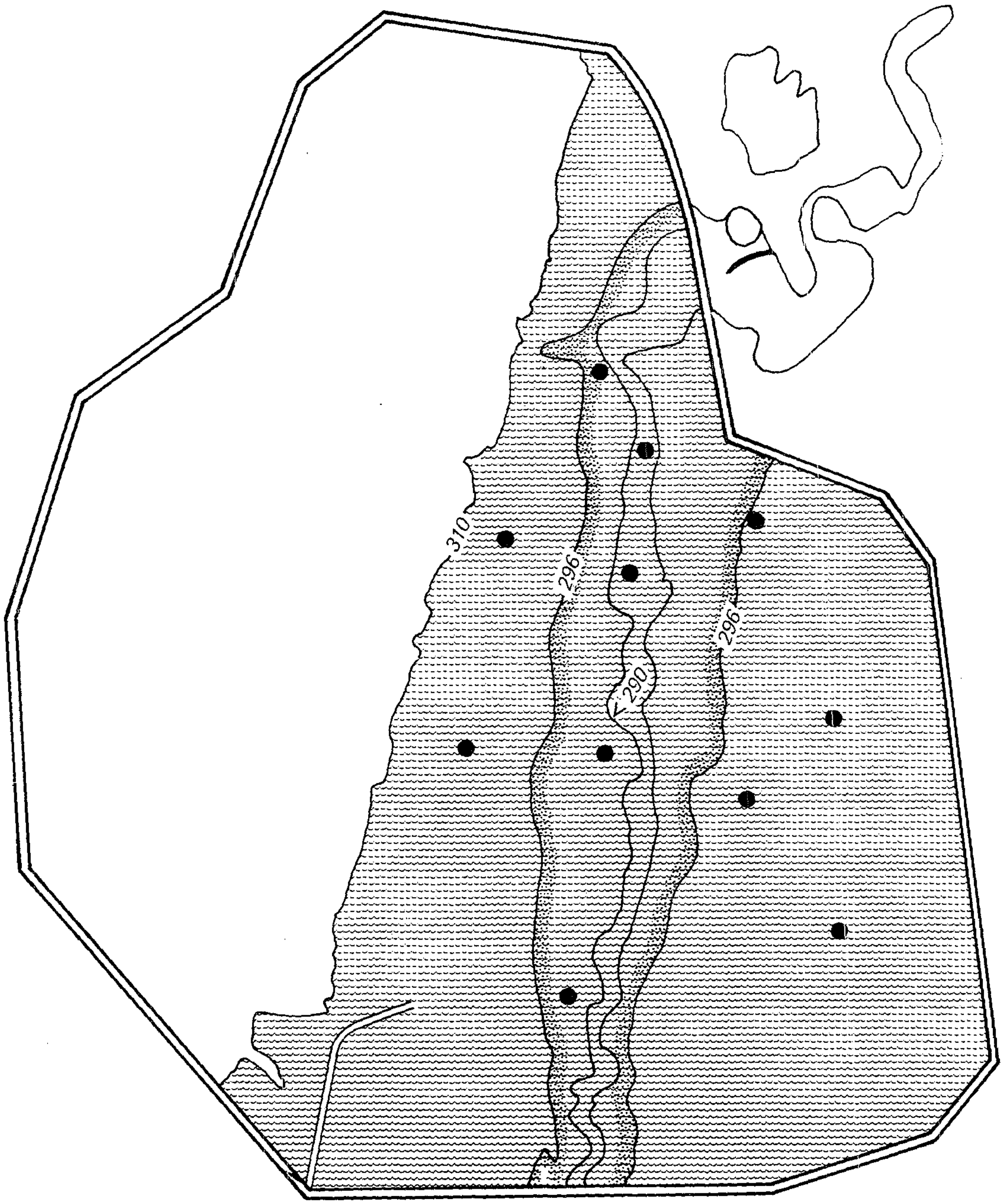

Figure 2. Outline of the tailings pond showing the remnants of Beaver Creek valley. Dots indicate approximate station locations.

ments are being drawn from the tailings pond. Potentially about 75% of the water usage will be from recycled tailings pond waters. Thus the tailings pond serves not only for the retention of process-affected waters, but also as a settling pond where the suspended solids in tailings will be allowed to settle out to produce water with solid concentration levels acceptable to the process requirements (<5% SPM).

The combired tailings from primary and secondary extractions are transported by pipeline as a slurry (water:sand:unextracted bitumen ≃ 50:50:1-1.5) to the tailings pond at variable discharge points. The coarse fraction (>44 μm) which makes up about 88% of tailings solids quickly settles out and most are retained for dyke and beach building processes. The fines (clay and sand <5 μm) fraction, about 4% of tailings solids is the material most likely to form suspensions or emulsions within the water column of the tailings pond. As the fines settle, a high concentration zone which can be classed as a sludge (>4% SPM) is expected to form (Fuhr *et al.*, 1977). Because of the hot water caustic extraction, the sand and clays remain "water wet". This means that a fairly stable clay or sand:water:bitumen suspension is formed. Thus, the settling process of these suspended solids should be slow. The dynamics of this settling process and the stability and ultimate concentration of the sludge zone must be understood if accurate estimates of potential recycle are to be predicted.

METHODS

OUTLINE OF SAMPLING AND ANALYTICAL SCHEME

Water samples from various depths were collected at locations throughout the tailings pond. The approximate location of stations that were sampled on each collection period is shown in Figure 2. The deepest water samples (≃20 m) were collected from the area of former Beaver Creek valley in which depths of up to 25 m were measured. During each sampling period, about 5-6 stations were sampled along the Beaver Creek valley with several (3-7) other stations located in the more shallow (3-10 m) areas in the eastern and western areas of the pond. At each station, water samples for later analyses were collected using a pump system. Also, real time measurement of temperature, pH, and conductivity was taken at 1 m intervals using a E.R.T. (NERA 4) water quality monitoring system. An outline of the analytical scheme used for tailings pond waters in this study (collection, preparation, analysis) is shown in Figure 3.

SAMPLE COLLECTION

Sampling was carried out from a 7 m Hewescraft outboard boat. After locating a station, the depth was measured using a sounding wire. If location was acceptable, a styrofoam "donut" was placed on the water to provide a clean zone through which sampling equipment could pass without being fouled by floating bitumen mats which are

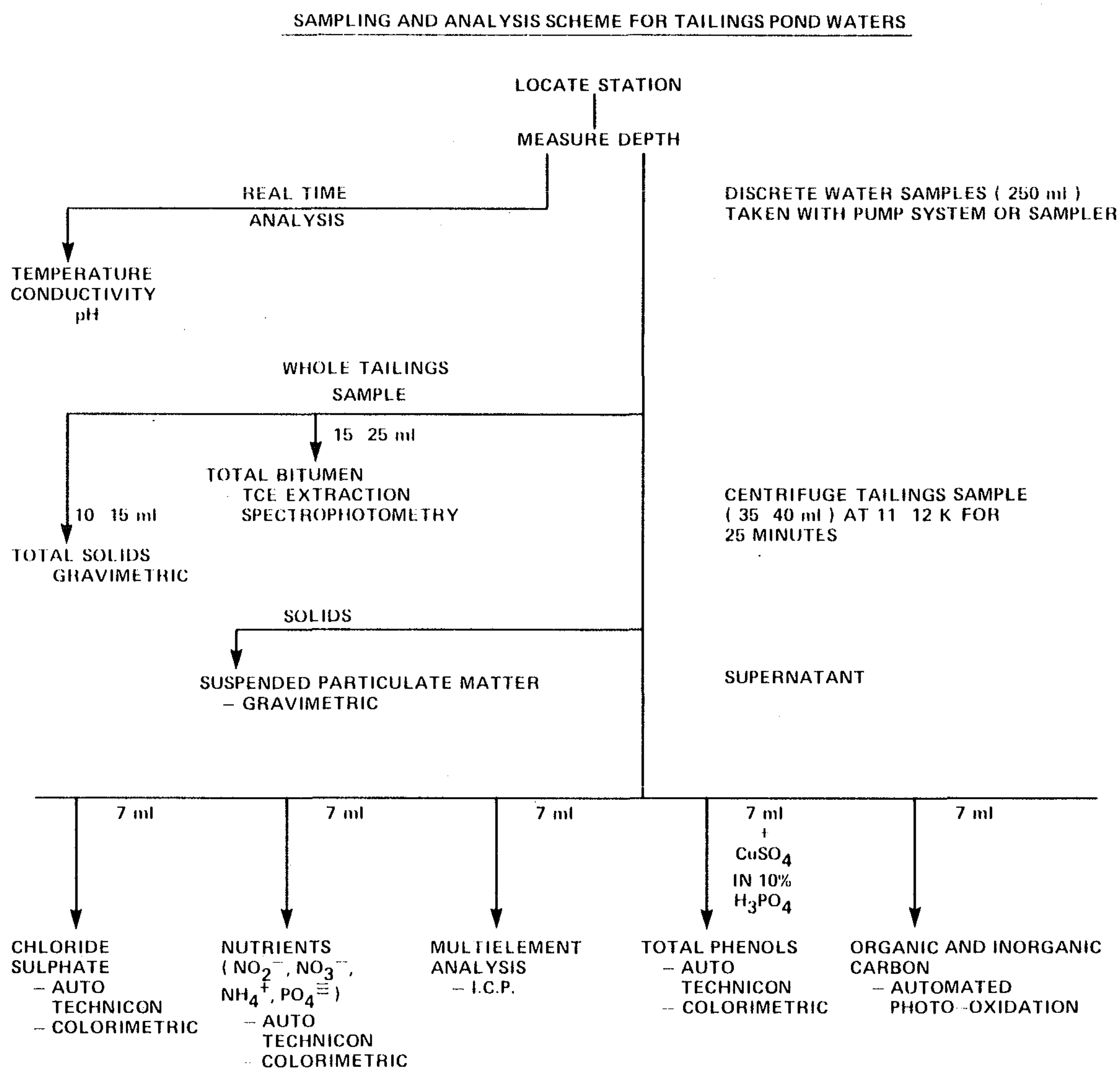

Figure 3. Sampling and analysis scheme for tailings pond waters.

commonly found on the pond. An E.R.T. (NERA 4) water quality monitoring system was used to measure the temperature, pH, and conductivity. The sonde, containing the specific electrodes, was lowered and readings were recorded at 1 m intervals. The sonde was enclosed within a plastic mesh in order to minimize interference from fouling by subsurface bitumen mats. This data collection took about 5 minutes.

Water samples were collected using a centrifugal pump (3 hp Monarch PBGF-6) system (Fig. 4). A polyethylene hose (1.25 cm O.D.) was lowered through the "donut" to the desired depths. Generally, standard depths of surface, 1, 2, 3, 5, 7, 10, 13, and 16 m were used. Water from each desired depth was pumped into a glass sample container (250 ml) which was well flushed (about 30-60 sec.) with the sample before removing. Since the water sample passed through the sample container before the pump, contamination or alteration of the sample from the pump was minimized. When filled, the sample bottle was immediately capped for analyses later. This process of flushing and filling the sample bottles was repeated at each depth. An average hydrocast (about 7 samples) took about 10 minutes.

Near bottom, samples (within 1 m of sediment) were difficult to take accurately with the pump system because of high solids content (>15%) and problems in gauging depth. A water sampler designed for collecting process samples (Falkenberg, 1978) was modified so that the sampler could be positioned at about 0.75 m from the sediment surface. The sampler was lowered closed, opened at depth, and then retrieved closed. The sample was immediately transferred to a glass sample bottle, and sealed until analysis.

During the 1980 study, water samples and E.R.T. profiles were collected on 30 April, 8 May, 17 June, 22 July, 25 August and 7 October. Profiles with the E.R.T. system for temperature, pH and conductivity were also run on 25 May, 8 July and 4 November. In this study, more than 300 water samples and 600 observations with the E.R.T. system were collected and analyzed.

SAMPLE HANDLING AND PREPARATION

Water samples were returned to the lab in the Environmental Complex where they were prepared for analyses. Aliquots of well mixed whole tailings water samples for total solids (15 ml preweighed glass vial) and for total bitumen (15-25 ml into 50 ml polypropylene test tube with screw caps) determinations were transferred from the glass sample bottles (250 ml screw cap jars) as soon as possible after returning from each sample trip. Procedures for the analysis of these variables were initiated immediately. Subsamples (about 35 ml) of tailings pond water for dissolved constituents were transferred to polypropylene test tubes with screw caps (Fisher Scientific #5-538-54) for transport to the Research Lab in Edmonton where they were centrifuged to remove suspended particulate matter (11-12 K R.P.M. for 25 minutes). After centrifugation, aliquots of the supernatant (5-6 ml) were carefully transferred to three screw-cap polypropylene transport tubes

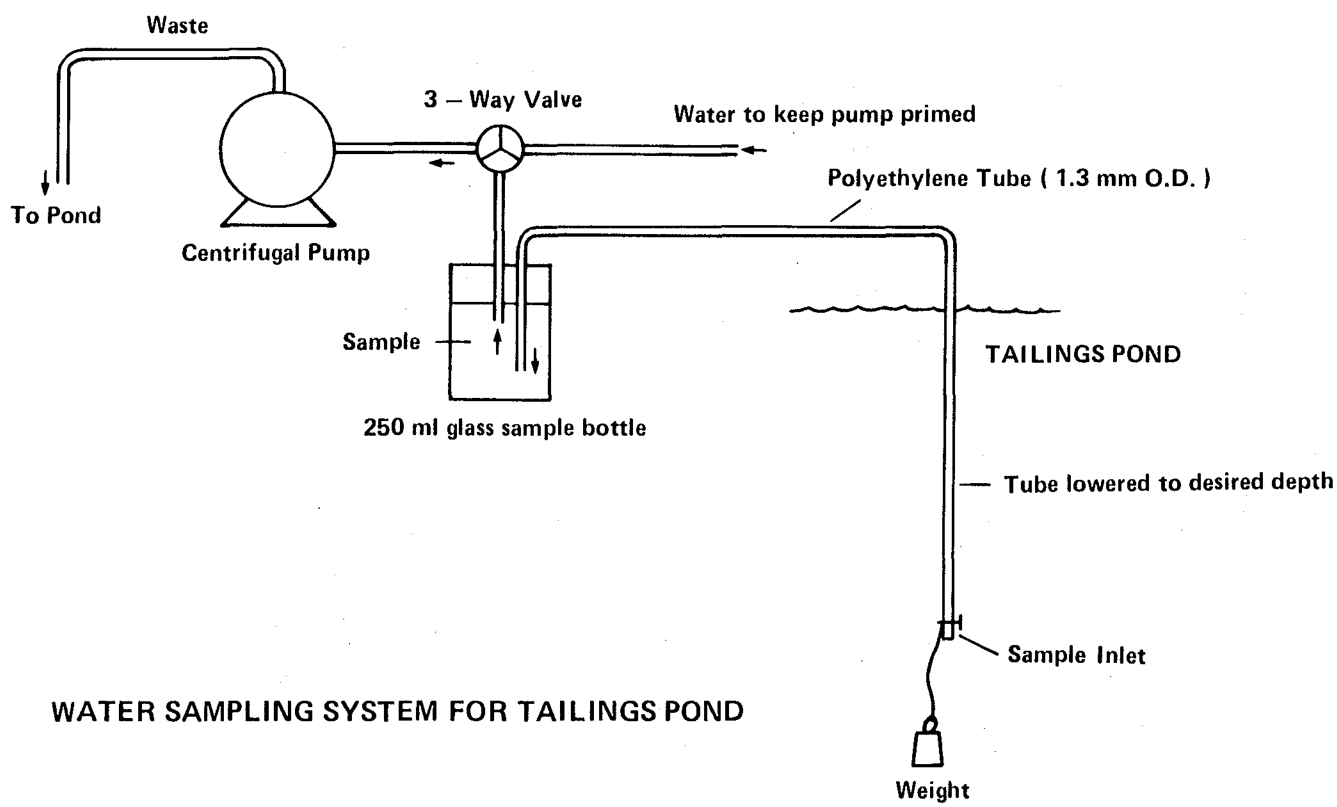

Figure 4. Outline of water sampling system used on tailings pond.

(8 ml, Canlab #V3001-100) and to a glass vial (7 ml) with teflon lined screw cap. No preservatives were added since storage times before analysis were short. Each of the transport tubes was labelled and sent for analysis; one for Cl^- and $SO_4^{=}$ and one for nutrients (NO_2^-, NO_3^-, NH_4^+ and $PO_4^{\equiv}$) to Chemex Labs in Calgary, and one for multi metal analysis by ICP to Research Lab in Edmonton. The samples in the glass vials were sent to Chemex Labs for organic and inorganic carbon analyses. On one sample date (22 July), another glass vial was prepared for total phenol analysis. In this case, a preservative (1% of 10% $CuSO_4$ in 10% H_3PO_4) was added and a handling time, from collection, preservation and delivery to Chemex, was less than 48 hrs. In all cases, storage of samples under refrigeration in dark was maintained.

After the supernatant in the centrifuge tube had been removed for analyses of dissolved species following the centrifugation, the suspended solids remaining in the centrifuge tube were scraped into preweighed scintillation vials. The transferred solids were dried and analysed gravimetrically for the suspended particulate matter (SPM).

SAMPLE ANALYSIS

An outline of the analytical scheme is shown in Figure 3 and the description of the analytical methods are summarized in Table 1. The NAQUADAT code numbers refer to standard analytical procedures described in the Alberta Environment Methods Manual for Chemical Analysis of Water and Wastewater (1977). Measurement of total solids, bitumen,

Table 1. Summary of the Analytical Methods.

VARIABLE	METHOD
Temperature pH Conductivity	Specific probes on Environmental Research and Technology (ERT - NERA 4) Water Quality Monitoring System.
Total Solids (%)	Gravimetric after drying whole sample (12-20 mls) at 100°. Weighed to 0.1 mg.
Suspended Particulate Matter (SPM) (%)	Solids concentrated by centrifugation (11-12 K R.P.M. for 25 minutes) of sample (30-40 mls) were dried at 100°. Weighed to 0.1 mg.
Dissolved Solids (%)	Calculated: T solids - SPM
Suspended Bitumen ($mg\ L^{-1}$)	3 time extraction (1:1) with trichloroethane on whole sample (10-30 ml). Measure extracted bitumen spectrophotometrically at 390, 470 and 550 nm.
Chloride (Cl^-) ($mg\ L^{-1}$)	NAQUADAT #17203 L : Automated Thiocyanate Method. Detection Limit: 0.1 $mg\ L^{-1}$.
Sulphate ($SO_4^=$) ($mg\ L^{-1}$)	NAQUADAT #16306 L : Automated Methylthymol Blue Method. Detection Limit: 1 $mg\ L^{-1}$.
Nitrite (NO_2^-)	NAQUADAT #07206 L : Automated Colourimetric Method. Dection Limit: 0.003 $mg\ N\ L^{-1}$.
Nitrate (NO_3^-)+ Nitrite (NO_2^-) ($mg\ N\ L^{-1}$)	NAQUADAT #07105 L : Automated Cadmium reduction. Detection Limit: 0.003 $mg\ N\ L^{-1}$.
Ammonia Nitrogen ($mg\ N\ L^{-1}$)	NAQUADAT #07561 L : Automated Colourimetric Phenate Method. Detection Limit: 0.002 $mg\ N\ L^{-1}$.
Ortho Phospahte ($PO_4^=$) ($mg\ P\ L^{-1}$)	NAQUADAT #15256 L : Automated Ascorbic Acid reduction. Detection Limit: 0.003 $mg\ P\ L^{-1}$.
Total Organic Carbon (Dissolved) ($mg\ C\ L^{-1}$)	NAQUADAT #06104 L : Automated U.V. Irradiation Method. Detection Limit: 0.1 $mg\ C\ L^{-1}$.
Inorganic Carbon (HCO_3^-) ($mg\ C\ L^{-1}$)	NAQUADAT #06052 L : Automated Purge after Acidification. Detection Limit : 0.5 $mg\ C\ L^{-1}$.
Total Phenol ($mg\ L^{-1}$)	NAQUADAT #06537 L : Automated 4 - Aminoantipyrine Method. Detection Limit: 0.001 $mg\ L^{-1}$.
Major Cations - Na^+, K^+, Ca^{++}, Mg^{++} Minor Elements - Cr, Zr, Ni, Cu, V, Ti, Co, Mo, Fe, Mn, Al, Cd, P, Si, Zn, B, Ba, Pb, Sn ($mg\ L^{-1}$)	Atomic Emission Spectrocopy (ICP). Detection limits vary with the element.

and suspended solids concentrations as well as all sample preparations were carried out in our facilities either at the site or in Edmonton. Trace metal concentrations were analyzed by atomic emission spectroscopy (Jarrel Ash Inductively Coupled Plasma System) at the Research Lab in Edmonton. Determination of Cl^-, $SO_4^=$, nutrients, total phenols, organic and inorganic carbon concentrations were performed by Chemex Labs in Calgary.

A high degree of accuracy in the analytical results was indicated by the internal consistency and reproducibility of results. This confidence in the results was also supported by the close agreement in the balance of equivalents of total cations (Na^+, K^+, Ca^{++}, Mg^{++}) and total anions (Cl^-, $SO_4^=$, HCO_3^-). A ratio of total cation to total anion equivalents for most natural waters should be about 1.00 ± 0.1 (Hem, 1970). When the mean results from all the sampling dates were examined, a mean ratio of total cation:total anion of about 1.01 ± .03 was calculated. This was consistent throughout depth profiles. The distribution of cation and anion equivalents with depth and their calcualte ratios can be seen in Figure 5. In this figure, the similarity of distribution of the major cation and anion equivalents with depth is evident. This close comparison between the total equivalents of cations and anions is an indication that the analytical procedures (at least in terms of major ions) can be considered accurate. Thus, we had a high degree of confidence in the analytical methodologies (collection, preparation and analysis) used in this study.

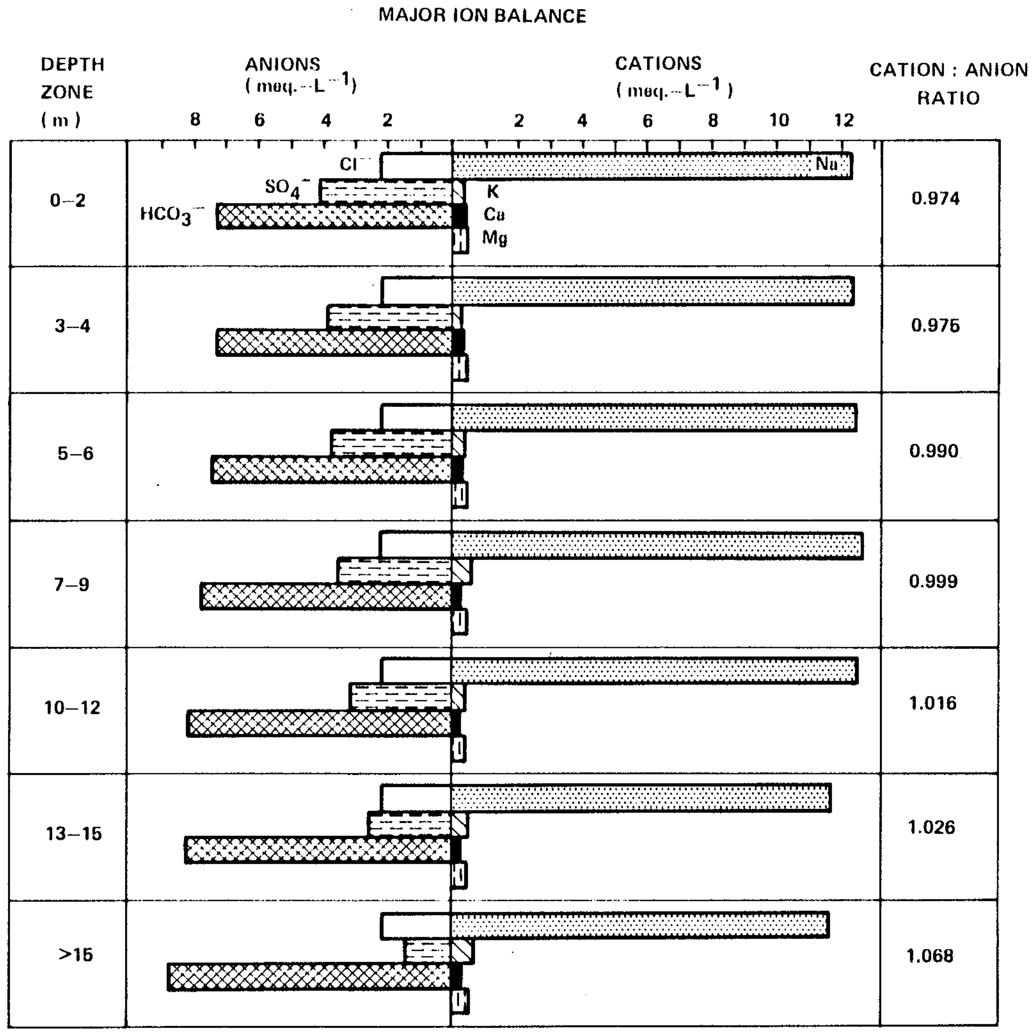

Figure 5. Depth profiles of major anion and cation equivalents and their ratios (total cation : total anion equivalents).

DATA HANDLING

The results of each sampling period were tabulated, coded and stored on a computer file at the University of Alberta. A copy of the command file is shown in Appendix 1. All statistical manipulations were carried out using subprograms in the SPSS package (Statistical Package for Social Sciences).

OBSERVATIONS

A listing of the analytical results for 1980 is given in Appendix II for each of the sampling dates (30 April, 8 May, 17 June, 22 July, 25 August, and 7 October). In Tables 2-7 the results for each sampling date are presented as the mean concentration ± one standard deviation of each of the variables averaged into depth zones (0-2, 3-4, 5-6, 7-9, 10-12, 13-15, >15 m). In Table 8, the mean results from all the data collected during the 1980 study are tabulated. Also, the range in these results for each variable is shown.

Trends in concentrations of specific variables were observed both with depth and with time during the period of this study. Generally, the tailings pond can be considered to be a well stratified waterbody. For most variables, the 6-10 m depth zone was where rapid changes were found. In this zone, a thermocline and a pycnocline were observed. The tailings pond has two distinct water types; 1. Surface Zone (0-6 m) - a well mixed, low but uniform density zone which shows rapid fluctuations in response to external (climate, tailings discharge) factors, 2. Deep Zone (>10 m) - a poorly mixed high density zone with variable gradients correlating with depth.

During each sampling date, no significant differences in variable distributions at various locations on the pond were found. Thus little areal or location influence on the distribution of properties within the tailings pond was observed. However, those samples collected close to

Table 2. Mean values ± standard deviation of variables in water samples from various depth zones in the tailings pond: 30 April.

Variable	Depth Zone (m) 0 - 2	3 - 4	5 - 6	7 - 9	10 - 12	13 - 15	> 15
Temperature (o)	15.05 ± .23 (3)	14.88 ± .46 (2)	12.35 ± 1.3 (2)	9.80 ± .74 (3)			
pH	8.50 ± .09 (3)	8.42 ± .03 (2)	8.41 ± .01 (2)	8.35 ± .08 (3)			
Total Solids (%)	N.A.	N.A.	N.A.	N.A.			
Suspended Particulate Matter (%)	.45 ± .02 (7)	.49 ± .08 (5)	.84 ± .15 (4)	1.64 ± .36 (5)	1.95 (1)	8.33 ± .78 (2)	
Bitumen (mg L^{-1})	244 ± 42 (7)	262 ± 34 (5)	575 ± 237 (4)	1082 ± 180 (5)	1640 (1)	6250 ± 560 (2)	
Total Organic Carbon (mgC L^{-1})	47.1 ± 4.7 (7)	53.0 ± 7.8 (5)	58.8 ± 10.6 (4)	54.2 ± 6.3 (3)			
Conductivity (µS cm^{-1})	1110 ± 20 (3)	1135 ± 10 (2)	1135 ± 10 (2)	1063 ± 80 (3)			
Chloride (mg L^{-1})	66.8 ± 3.7 (7)	67.0 ± 5.7 (5)	70.5 ± 5.9 (4)	67.0 ± 5.9 (4)	75.0 (1)	68.5 ± .71 (2)	
Sulphate (mg L^{-1})	175.7 ± 3.5 (7)	168.0 ± 9.1 (5)	170.0 ± 10.1 (4)	157.5 ± 8.7 (4)	146.0 (1)	115.0 ± 7.1 (2)	
Bicarbonate (mg L^{-1})	363 ± 26 (7)	358 ± 34 (5)	340 ± 23 (4)	410 ± 18 (2)			
Sodium (mg L^{-1})	262.9 ± 19 (7)	259.0 ± 18 (5)	265.8 ± 16 (4)	279.5 ± 20 (4)	321.0 (1)	271.0 ± 7.1 (2)	
Potassium (mg L^{-1})	8.30 ± 1.2 (7)	8.48 ± 1.9 (5)	11.50 ± 2.2 (4)	11.43 ± 1.8 (4)	16.70 (1)	12.55 ± .78 (2)	

Table 2 (concluded).

Variable	Depth Zone (m) 0 - 2	3 - 4	5 - 6	7 - 9	10 - 12	13 - 15	> 15
Calcium (mg L^{-1})	5.90 ± .40 (7)	5.48 ± .72 (5)	4.98 ± .54 (4)	5.25 ± .13 (4)	5.90 (1)	3.70 ± .14 (2)	
Magnesium (mg L^{-1})	4.50 ± .60 (7)	4.38 ± .72 (5)	5.40 ± .94 (4)	5.53 ± .32 (4)	7.40 (1)	5.30 ± .14 (2)	
Vanadium (mg L^{-1})	.057 ± .01 (7)	.057 ± .01 (5)	.088 ± .03 (4)	.093 ± .01 (4)	.141 (1)	.081 ± .013 (2)	
Titanium (mg L^{-1})	.757 ± .25 (7)	.706 ± .28 (5)	1.032 ± .38 (4)	.650 ± .23 (4)	1.251 (1)	.328 ± .003 (2)	
Molybdenum (mg L^{-1})	.121 ± .02 (7)	.124 ± .02 (5)	.126 ± .07 (4)	.166 ± .04 (4)	.173 (1)	.118 ± .01 (2)	
Iron (mg L^{-1})	6.28 ± 2.2 (7)	6.13 ± 2.6 (5)	11.81 ± .40 (4)	11.46 ± 2.6 (4)	21.85 (1)	14.74 ± 2.5 (2)	
Manganese (mg L^{-1})	.058 ± .01 (2)	.059 ± .02 (2)	.078 ± .02 (2)	.085 ± .01 (2)	.144 (2)	.139 ± .04 (2)	
Aluminum (mg L^{-1})	28.08 ± 9.6 (7)	27.82 ± 11.8 (5)	52.75 ± 17.8 (4)	46.13 ± 11.9 (4)	90.9 (1)	47.63 ± 7.8 (2)	
Cadmium (mg L^{-1})	.090 ± .04 (5)	.123 ± .04 (3)	.080 ± .04 (4)	.087 ± .06 (4)	.017 (1)	.024 ± .03 (2)	
Boron (mg L^{-1})	.797 ± .32 (7)	.892 ± .09 (5)	1.015 ± .09 (4)	1.065 ± .05 (4)	1.106 (1)	.937 ± .02 (2)	
Lead (mg L^{-1})	.133 ± .05 (5)	.177 ± .06 (3)	.191 ± (1)	.156 ± .05 (3)	N.A.	.043 (1)	

Table 3. Mean values ± standard deviation of variables in water samples from various depth zones in the tailings pond: 8 May.

Variable	Depth Zone (m) 0 - 2	3 - 4	5 - 6	7 - 9	10 - 12	13 - 15	> 15
Temperature (o)	15.37 ± .50 (30)	14.94 ± .28 (18)	15.57 ± .72 (13)	12.44 ± 2.47 (16)	10.63 ± 1.42 (13)	10.80 ± 1.72 (6)	
pH	8.24 ± .10 (30)	8.23 ± .11 (18)	8.26 ± .13 (13)	8.35 ± .11 (16)	8.37 ± .08 (13)	8.34 ± .05 (6)	
Total Solids (%)	.68 ± .01 (30)	.69 ± .02 (12)	.85 ± .11 (9)	1.62 ± .66 (6)	2.87 ± .58 (6)	3.65 ± .41 (6)	
Suspended Particulate Matter (%)	.54 ± .03 (26)	.55 ± .03 (11)	.71 ± .09 (9)	1.38 ± .53 (6)	2.65 ± .53 (6)	3.49 ± .50 (6)	
Bitumen (mg L^{-1})	338 ± 12 (30)	337 ± 10 (12)	455 ± 117 (9)	974 ± 510 (6)	1710 ± 610 (6)	2261 ± 170 (6)	
Total Organic Carbon (mgC L^{-1})	54.7 ± 5.9 (30)	53.8 ± 6.3 (12)	56.1 ± 7.5 (9)	68.3 ± 20.2 (6)	51.3 ± 7.0 (6)	65.8 ± 17.2 (6)	
Conductivity (μS cm^{-1})	1010 ± 100 (28)	1079 ± 100 (18)	1125 ± 100 (13)	1070 ± 40 (16)	1040 ± 20 (13)	1030 ± 40 (6)	
Chloride (mg L^{-1})	73.6 ± 5.3 (30)	73.2 ± 4.8 (12)	76.3 ± 5.4 (9)	73.2 ± 7.4 (6)	69.3 ± 6.9 (6)	67.8 ± 4.5 (6)	
Sulphate (mg L^{-1})	192.5 ± 13 (30)	183.3 ± 8 (12)	183.9 ± 5 (9)	177.5 ± 16 (6)	160.0 ± 14.5 (6)	134.2 ± 10.7 (6)	
Bicarbonate (mg L^{-1})	436 ± 25 (30)	434 ± 17 (12)	447 ± 20 (9)	467 ± 10 (5)	475 ± 11 (6)	463.6 ± 30 (6)	
Sodium (mg L^{-1})	27.0 ± 16.8 (30)	279.9 ± 12.0 (12)	285.6 ± 14.0 (9)	274.0 ± 19.8 (6)	269.3 ± 24.3 (6)	271.8 ± 15.8 (5)	
Potassium (mg L^{-1})	7.43 ± 1.5 (30)	6.86 ± 1.8 (12)	7.74 ± 2.1 (9)	9.65 ± 3.0 (6)	7.78 ± 1.1 (6)	8.10 ± .86 (5)	

Table 3 (concluded).

Variable	Depth Zone (m) 0 - 2	3 - 4	5 - 6	7 - 9	10 - 12	13 - 15	> 15
Calcium ($mg\ L^{-1}$)	6.15 ± .85 (30)	5.84 ± .37 (12)	5.32 ± .68 (9)	5.07 ± .42 (6)	4.23 ± .42 (6)	4.62 ± .13 (5)	
Magnesium ($mg\ L^{-1}$)	4.25 ± .77 (30)	3.94 ± .80 (12)	3.88 ± .58 (9)	5.05 ± 1.6 (6)	3.67 ± .50 (6)	3.68 ± .39 (5)	
Vanadium ($mg\ L^{-1}$)	.039 ± .05 (27)	.028 ± .02 (11)	.067 ± .10 (9)	.069 ± .04 (6)	.036 ± .01 (6)	.034 ± .01 (6)	
Titanium ($mg\ L^{-1}$)	.562 ± .51 (30)	.474 ± .30 (11)	.496 ± .35 (9)	.646 ± .36 (6)	.275 ± .25 (6)	.267 ± .12 (6)	
Molybdenum ($mg\ L^{-1}$)	.066 ± .04 (27)	.060 ± .04 (11)	.062 ± .03 (9)	.085 ± .026 (6)	.056 ± .008 (6)	.075 ± .04 (6)	
Iron ($mg\ L^{-1}$)	4.47 ± 5.97 (30)	3.17 ± 3.43 (12)	4.23 ± 3.80 (9)	9.36 ± 5.7 (6)	3.99 ± 1.77 (6)	4.22 ± 1.33 (6)	
Manganese ($mg\ L^{-1}$)	.060 ± .043 (30)	.053 ± .024 (12)	.090 ± .10 (9)	.078 ± .04 (6)	.040 ± .02 (6)	.044 ± .02 (6)	
Aluminum ($mg\ L^{-1}$)	17.72 ± .26 (30)	12.01 ± 15.4 (12)	16.36 ± 17.0 (9)	36.19 ± 23.9 (6)	13.92 ± 6.9 (6)	14.81 ± 5.0 (6)	
Cadmium ($mg\ L^{-1}$)	.018 ± .011 (29)	.022 ± .030 (12)	.017 ± .010 (8)	.015 ± .009 (6)	.015 ± .015 (6)	.023 ± .013 (5)	
Boron ($mg\ L^{-1}$)	.856 ± .13 (30)	.849 ± .10 (30)	.902 ± .10 (9)	.916 ± .08 (6)	.848 ± .15 (6)	.892 ± .08 (6)	
Lead ($mg\ L^{-1}$)	.025 ± .017 (29)	.032 ± .022 (12)	.028 ± .011 (9)	.021 ± .011 (6)	.029 ± .008 (6)	.032 ± .015 (5)	

Table 4. Mean values ± standard deviation of variables in water samples from various depth zones in the tailings pond: 17 June.

Variable	Depth Zone (m) 0 - 2	3 - 4	5 - 6	7 - 9	10 - 12	13 - 15	> 15
Temperature (o)	18.65 ± .46 (33)	18.05 ± .35 (21)	17.83 ± 1.23 (17)	13.51 ± 1.64 (22)	11.53 ± 1.30 (16)	11.45 ± 1.17 (6)	
pH	8.14 ± .03 (22)	8.14 ± .03 (9)	8.26 ± .14 (8)	8.45 ± .06 (7)	8.62 ± .05 (7)	8.70 ± .01 (8)	8.70 ± 0 (2)
Total Solids (%)	.81 ± .01 (27)	.81 ± .01 (9)	1.11 ± .24 (8)	1.78 ± .33 (7)	2.83 ± .39 (7)	4.33 ± .90 (6)	11.87 ± 1.51 (2)
Suspended Particulate Matter (%)	.69 ± .01 (27)	.69 ± .02 (9)	.98 ± .24 (8)	1.64 ± .32 (7)	2.62 ± .34 (7)	4.82 ± 2.18 (7)	11.60 ± 1.53 (2)
Bitumen (mg L^{-1})	368 ± 22 (27)	369 ± 19 (8)	672 ± 355 (9)	1086 ± 450 (7)	1794 ± 450 (7)	5030 ± 5800 (8)	5160 ± 200 (2)
Total Organic Carbon (mgC L^{-1})	40.1 ± 4.5 (27)	50.0 ± 4.9 (9)	38.5 ± 58.5 (8)	44.1 ± 7.9 (7)	47.0 ± 7.2 (7)	41.4 ± 2.6 (8)	64.0 ± 2.4 (3)
Conductivity (µS cm^{-1})	1138 ± 140 (33)	1134 ± 90 (21)	1148 ± 66 (17)	1090 ± 50 (22)	1065 ± 20 (16)	1032 ± 35 (6)	
Chloride (mg L^{-1})	78.5 ± 6.0 (27)	78.7 ± 6.3 (9)	76.9 ± 1.4 (8)	80.6 ± 7.8 (7)	76.1 ± 7.1 (7)	74.3 ± 8.5 (8)	84.3 ± 9.8 (3)
Sulphate (mg L^{-1})	210.7 ± 16 (27)	210.6 ± 18 (9)	195.6 ± 7 (8)	194.3 ± 17.2 (7)	154.3 ± 24.4 (7)	128.1 ± 28.6 (8)	103.3 ± 67.9 (3)
Bicarbonate (mg L^{-1})	447 ± 26 (27)	446 ± 24 (9)	440 ± 7 (8)	460 ± 33 (7)	486 ± 26 (7)	475 ± 14 (8)	507 ± 53 (3)
Sodium (mg L^{-1})	276.0 ± 20 (27)	277.2 ± 23 (9)	270.7 ± 4 (8)	278.7 ± 22 (7)	275.4 ± 23 (7)	256.6 ± 4.7 (8)	286.0 ± 27 (3)
Potassium (mg L^{-1})	11.49 ± 2.5 (27)	11.86 ± 3.4 (9)	11.98 ± 3.0 (8)	14.64 ± 2.9 (7)	18.02 ± 4.9 (7)	14.92 ± 3.9 (8)	28.3 ± 13.7 (3)

Table 4 (concluded).

Variable	Depth Zone (m) 0 - 2	3 - 4	5 - 6	7 - 9	10 - 12	13 - 15	> 15
Calcium (mg L^{-1})	6.70 ± .51 (27)	6.58 ± .55 (9)	5.57 ± .58 (8)	5.31 ± .81 (7)	4.84 ± .79 (7)	4.20 ± .48 (8)	4.31 ± .54 (3)
Magnesium (mg L^{-1})	4.77 ± .53 (27)	4.75 ± .59 (9)	4.49 ± .18 (8)	5.24 ± 1.26 (7)	5.82 ± 1.48 (7)	4.69 ± .57 (8)	8.56 ± 3.8 (3)
Vanadium (mg L^{-1})	.020 ± .007 (27)	.021 ± .009 (9)	.025 ± .009 (8)	.044 ± .019 (7)	.065 ± .021 (7)	.047 ± .015 (8)	.117 ± .086 (3)
Titanium (mg L^{-1})	.149 ± .06 (27)	.150 ± .07 (9)	.148 ± .04 (8)	.258 ± .15 (7)	.349 ± .17 (7)	.175 ± .07 (8)	.387 ± .27 (3)
Molybdenum (mg L^{-1})	.064 ± .029 (27)	.070 ± .041 (9)	.067 ± .031 (8)	.078 ± .032 (7)	.087 ± .028 (7)	.077 ± .02 (8)	.148 ± .06 (3)
Iron (mg L^{-1})	2.59 ± .80 (27)	2.65 ± .88 (9)	3.39 ± .95 (8)	6.52 ± 3.39 (7)	10.49 ± 3.46 (7)	8.00 ± 2.63 (8)	21.37 ± 15.1 (3)
Manganese (mg L^{-1})	.043 ± .014 (27)	.044 ± .009 (9)	.047 ± .015 (8)	.062 ± .022 (7)	.078 ± .023 (7)	.058 ± .013 (8)	.126 ± .073 (3)
Aluminum (mg L^{-1})	9.37 ± 3.3 (27)	9.62 ± 3.7 (9)	11.95 ± 3.4 (8)	23.34 ± 13.1 (7)	36.17 ± 13.6 (7)	25.65 ± 8.8 (8)	65.25 ± 45.7 (3)
Cadmium (mg L^{-1})	.024 ± .016 (25)	.026 ± .019 (9)	.029 ± .021 (8)	.025 ± .031 (7)	.026 ± .016 (7)	.024 ± .016 (8)	.017 ± .006 (2)
Boron (mg L^{-1})	.969 ± .10 (27)	.982 ± .13 (9)	.958 ± .08 (8)	.992 ± .13 (7)	1.006 ± .13 (7)	.924 ± .09 (8)	1.332 ± .30 (3)
Lead (mg L^{-1})	.047 ± .072 (25)	.043 ± .034 (9)	.043 ± .031 (8)	.043 ± .036 (7)	.059 ± .030 (6)	.042 ± .027 (8)	.051 ± .029 (3)

Table 5. Mean values ± standard deviation of variables in water samples from various depth zones in the tailings pond: 22 July.

Variable	Depth Zone (m) 0 - 2	3 - 4	5 - 6	7 - 9	10 - 12	13 - 15	> 15
Temperature (o)	21.10 ± .43 (33)	20.68 ± .47 (21)	20.00 ± .98 (17)	15.35 ± 1.75 (17)	12.98 ± 1.34 (15)	12.76 ± 2.1[illegible] (6)	12.33 ± 2.16 (2)
pH	7.90 ± .14 (33)	7.87 ± .14 (21)	7.94 ± .16 (17)	8.12 ± .23 (17)	8.23 ± .23 (13)	8.24 ± .26 (6)	8.25 ± .33 (2)
Total Solids (%)	.74 ± .01 (24)	.74 ± .01 (8)	.74 ± .01 (7)	.93 ± .11 (5)	2.66 ± .65 (5)	5.56 ± 4.17 (4)	30.44 ± 11.4 (2)
Suspended Particulate Matter (%)	.61 ± .02 (24)	.61 ± .02 (8)	.60 ± .02 (7)	.79 ± .10 (5)	2.48 ± .64 (5)	5.23 ± 3.94 (4)	28.76 ± 11.4 (2)
Bitumen ($mg\ L^{-1}$)	266 ± 39 (24)	303 ± 12 (8)	256 ± 49 (7)	366 ± 117 (5)	1510 ± 440 (5)	4300 ± 5400 (4)	32345 ± 23000 (2)
Total Organic Carbon ($mgC\ L^{-1}$)	42.4 ± 1.4 (24)	42.7 ± 1.4 (8)	42.4 ± 1.4 (7)	42.3 ± 41.1 (5)	43.2 ± 1.0 (5)	46.5 ± 3.6 (4)	53.9 ± .8 (2)
Conductivity ($\mu S\ cm^{-1}$)	845 ± 280 (23)	1090 ± 190 (21)	1205 ± 140 (17)	1290 ± 120 (17)	1340 ± 40 (13)	1270 ± 50 (6)	1210 ± 0 (2)
Chloride ($mg\ L^{-1}$)	80.9 ± 1.6 (24)	80.8 ± 2.1 (8)	81.4 ± 1.6 (7)	82.2 ± 1.8 (5)	78.6 ± 1.9 (5)	74.3 ± 2.9 (4)	58.5 ± 12.0 (2)
Sulphate ($mg\ L^{-1}$)	193.7 ± 2.5 (24)	195.3 ± 3.2 (8)	194.6 ± 1.9 (7)	192.4 ± 10.4 (5)	155.6 ± 10.0 (5)	131.3 ± 14.7 (4)	13.2 ± 14.4 (2)
Bicarbonate ($mg\ L^{-1}$)	476 ± 6 (24)	474 ± 5 (8)	479 ± 8 (7)	483 ± 15 (5)	505 ± 13 (5)	524 ± 10 (4)	481 ± 11 (2)
Sodium ($mg\ L^{-1}$)	281.6 ± 4.8 (24)	280.9 ± 3.4 (8)	280.7 ± 4.3 (7)	282.2 ± 2.6 (5)	300.6 ± 4.9 (5)	272.0 ± 9.8 (4)	202.5 ± 2.1 (2)
Potassium ($mg\ L^{-1}$)	17.53 ± 3.7 (24)	18.18 ± 3.6 (8)	17.24 ± 3.8 (7)	16.81 ± 4.6 (5)	28.57 ± 5.9 (5)	31.36 ± 7.0 (4)	25.3 ± 14.9 (2)

Table 5 (concluded).

Variable	Depth Zone (m) 0 - 2	3 - 4	5 - 6	7 - 9	10 - 12	13 - 15	> 15
Calcium (mg L^{-1})	6.65 ± .36 (24)	6.56 ± .33 (8)	6.68 ± .32 (7)	6.43 ± 1.13 (5)	5.03 ± .39 (5)	4.78 ± .16 (4)	5.14 ± .13 (2)
Magnesium (mg L^{-1})	4.77 ± .22 (24)	4.76 ± .24 (8)	4.87 ± .24 (7)	4.87 ± .26 (5)	5.86 ± .45 (5)	5.98 ± .37 (4)	6.02 ± 1.9 (2)
Vanadium (mg L^{-1})	.016 ± .007 (24)	.016 ± .005 (8)	.016 ± .005 (7)	.020 ± .007 (5)	.050 ± .007 (5)	.058 ± .017 (4)	.079 ± .019 (2)
Titanium (mg L^{-1})	.134 ± .04 (24)	.156 ± .10 (8)	.139 ± .04 (7)	.208 ± .12 (5)	.306 ± .04 (5)	.251 ± .07 (4)	.257 ± .05 (2)
Molybdenum (mg L^{-1})	.065 ± .05 (23)	.133 ± .08 (6)	.045 ± .01 (5)	.052 ± .01 (4)	.140 ± .05 (5)	.083 ± .02 (4)	.090 ± .00 (2)
Iron (mg L^{-1})	2.47 ± .32 (24)	2.66 ± .70 (8)	2.72 ± .53 (7)	3.44 ± 1.04 (5)	3.87 ± 1.76 (5)	10.62 ± 1.5 (4)	13.47 ± 7.3 (2)
Manganese (mg L^{-1})	.053 ± .020 (24)	.050 ± .005 (7)	.061 ± .027 (7)	.056 ± .004 (4)	.086 ± .002 (5)	.080 ± .012 (4)	.097 ± .04 (2)
Aluminum (mg L^{-1})	8.62 ± 1.1 (24)	9.58 ± 3.0 (8)	9.69 ± 2.0 (7)	12.44 ± 4.2 (5)	30.87 ± 6.3 (5)	35.45 ± 4.7 (4)	38.16 ± 21.6 (2)
Cadmium (mg L^{-1})	.022 ± .008 (23)	.023 ± .007 (8)	.022 ± .004 (7)	.028 ± .014 (5)	.039 ± .048 (5)	.037 ± .018 (4)	.048 (1)
Boron (mg L^{-1})	.973 ± .08 (24)	1.009 ± .15 (8)	.914 ± .10 (7)	.956 ± .09 (5)	1.076 ± .07 (5)	.995 ± .03 (4)	.945 ± .02 (2)
Lead (mg L^{-1})	.031 ± .013 (24)	.031 ± .010 (9)	.029 ± .009 (6)	.036 ± .020 (5)	.052 ± .013 (5)	.051 ± .022 (4)	.073 ± (1)

Table 6. Mean values ± standard deviation of variables in water samples from various depth zones in the tailings pond: 25 August.

Variable	Depth Zone (m) 0 - 2	3 - 4	5 - 6	7 - 9	10 - 12	13 - 15	> 15
Temperature (o)	16.54 ± .30 (33)	16.47 ± .51 (20)	17.81 ± 1.18 (15)	15.81 ± 1.46 (19)	14.34 ± .97 (15)	12.9 ± 1.96 (9)	11.78 ± 2.02 (2)
pH	8.01 ± .05 (33)	8.00 ± .05 (20)	8.03 ± .06 (15)	8.01 ± .09 (19)	8.14 ± .05 (15)	8.19 ± .12 (9)	8.29 ± .17 (2)
Total Solids (%)	.59 ± .02 (16)	.59 ± .02 (8)	.60 ± .01 (8)	1.39 ± .88 (12)	3.53 ± .07 (5)	6.55 ± 4.13 (6)	
Suspended Particulate Matter (%)	.46 ± .02 (16)	.46 ± .02 (8)	.46 ± .03 (8)	1.23 ± .84 (12)	3.33 ± .07 (5)	6.19 ± 4.00 (6)	
Bitumen (mg L^{-1})	175 ± 30 (16)	202 ± 17 (8)	187 ± 36 (8)	629 ± 590 (12)	1918 ± 130 (5)	2100 ± 810 (6)	
Total Organic Carbon (mgC L^{-1})	44.8 ± 1.8 (16)	45.1 ± 1.4 (8)	45.3 ± 1.5 (8)	45.0 ± 1.5 (12)	47.4 ± 2.2 (5)	52.4 ± 7.2 (6)	
Conductivity (μS cm^{-1})	1431 ± 10 (33)	1427 ± 10 (20)	1440 ± 20 (15)	1300 ± 45 (19)	1253 ± 20 (15)	1180 ± 60 (9)	1115 ± 35 (2)
Chloride (mg L^{-1})	76.9 ± 1.2 (16)	76.3 ± 3.0 (8)	77.3 ± 1.0 (8)	74.6 ± 2.7 (12)	68.6 ± 1.5 (5)	67.2 ± 2.9 (6)	
Sulphate (mg L^{-1})	197.8 ± 14.4 (16)	196.6 ± 31.4 (8)	201.3 ± 11.9 (8)	169.4 ± 30.7 (12)	119.4 ± 10.5 (5)	96.7 ± 38.0 (6)	
Bicarbonate (mg L^{-1})	469 ± 6 (16)	468 ± 9 (8)	469 ± 5 (8)	483 ± 17 (12)	500 ± 10 (5)	507 ± 14 (6)	
Sodium (mg L^{-1})	293.2 ± 7.0 (16)	294.8 ± 9.2 (8)	294.0 ± 5.0 (8)	292.7 ± 12.0 (12)	278.9 ± 7.9 (5)	275.9 ± 16.1 (6)	
Potassium (mg L^{-1})	23.02 ± 1.00 (16)	23.48 ± .93 (8)	23.24 ± 1.2 (8)	25.66 ± 2.88 (12)	31.52 ± 5.3 (5)	38.3 ± 5.5 (6)	

Table 6 (concluded).

Variable	Depth Zone (m) 0 - 2	3 - 4	5 - 6	7 - 9	10 - 12	13 - 15	> 15
Calcium ($mg\ L^{-1}$)	6.45 ± .63 (16)	6.30 ± .57 (8)	6.14 ± .41 (8)	5.57 ± .60 (12)	4.46 ± .47 (5)	4.15 ± .30 (6)	
Magnesium ($mg\ L^{-1}$)	4.56 ± .36 (16)	4.53 ± .39 (8)	4.49 ± .35 (8)	4.88 ± .66 (12)	5.49 ± 1.17 (5)	6.69 ± 1.2 (6)	
Vanadium ($mg\ L^{-1}$)	.025 ± .008 (8)	.039 ± .016 (4)	.018 ± .014 (6)	.034 ± .019 (10)	.062 ± .015 (5)	.071 ± .031 (6)	
Titanium ($mg\ L^{-1}$)	.162 ± .05 (16)	.141 ± .03 (8)	.140 ± .03 (8)	.215 ± .06 (12)	.322 ± .08 (5)	.380 ± .07 (6)	
Molybdenum ($mg\ L^{-1}$)	.055 ± .04 (16)	.050 ± .04 (8)	.124 ± .21 (8)	.073 ± .04 (12)	.072 ± .04 (5)	.079 ± .02 (6)	
Iron ($mg\ L^{-1}$)	1.94 ± .51 (16)	2.13 ± .40 (8)	2.06 ± .22 (8)	4.24 ± 2.43 (12)	8.78 ± 3.8 (5)	13.82 ± 4.8 (6)	
Manganese ($mg\ L^{-1}$)	.046 ± .010 (16)	.050 ± .016 (8)	.056 ± .032 (8)	.051 ± .012 (12)	.077 ± .04 (5)	.120 ± .062 (6)	
Aluminum ($mg\ L^{-1}$)	7.30 ± 1.9 (16)	7.91 ± 1.7 (8)	7.61 ± .90 (8)	15.72 ± 8.9 (12)	31.17 ± 13.1 (5)	46.56 ± 14.3 (6)	
Cadmium ($mg\ L^{-1}$)	.033 ± .03 (16)	.034 ± .03 (8)	.033 ± .02 (8)	.042 ± .02 (11)	.069 ± .05 (5)	.071 ± .01 (4)	
Boron ($mg\ L^{-1}$)	.530 ± .15 (16)	.521 ± .16 (8)	.502 ± .16 (8)	.541 ± .16 (12)	.510 ± .20 (5)	.582 ± .20 (6)	
Lead ($mg\ L^{-1}$)	.040 ± .023 (16)	.040 ± .024 (8)	.038 ± .022 (8)	.049 ± .020 (12)	.077 ± .040 (5)	.080 ± .042 (6)	

Table 7. Mean values ± standard deviation of variables in water samples from various depth zones in the tailings pond: 7 October.

Variable	Depth Zone (m) 0 - 2	3 - 4	5 - 6	7 - 9	10 - 12	13 - 15	> 15
Temperature (o)	10.49 ± .09 (21)	10.41 ± .07 (14)	11.14 ± .83 (14)	14.28 ± 1.04 (21)	14.83 ± .66 (18)	14.58 ± .51 (8)	14.2 ± .57 (2)
pH	8.18 ± .15 (21)	8.15 ± .13 (14)	8.17 ± .11 (14)	8.15 ± .11 (21)	8.08 ± .10 (18)	8.09 ± .06 (8)	8.10 ± .06 (2)
Total Solids (%)	.62 ± .01 (11)	.62 ± .00 (6)	.62 ± .02 (6)	.88 ± .53 (8)	1.28 ± .40 (6)	2.54 ± .21 (4)	15.89 ± 7.9 (4)
Suspended Particulate Matter (%)	.48 ± .02 (11)	.49 ± .01 (6)	.49 ± .02 (6)	.72 ± .49 (8)	1.10 ± .37 (6)	2.35 ± .23 (4)	14.82 ± 7.5 (4)
Bitumen (mg L^{-1})	201 ± 30 (11)	199 ± 16 (6)	189 ± 28 (6)	340 ± 264 (8)	534 ± 217 (6)	1040 ± 110 (4)	29000 ± 26000 (4)
Total Organic Carbon (mgC L^{-1})	57.5 ± 4.0 (11)	56.5 ± 2.5 (6)	58.3 ± 5.3 (6)	56.7 ± 1.6 (8)	64.8 ± 7.4 (6)	59.5 ± 2.5 (4)	67.3 ± 10.3 (2)
Conductivity (μS cm^{-1})	1223 ± 166 (21)	1256 ± 190 (14)	1230 ± 190 (14)	1224 ± 200 (21)	1210 ± 170 (18)	1160 ± 160 (8)	1143 ± 180 (2)
Chloride (mg L^{-1})	85.4 ± 1.2 (11)	85.5 ± .9 (6)	85.6 ± 1.8 (6)	84.3 ± 3.3 (8)	83.7 ± 3.1 (6)	79.9 ± 1.4 (4)	74.4 ± 8.0 (4)
Sulphate (mg L^{-1})	193.9 ± 3.3 (11)	194.7 ± 3.8 (6)	192.5 ± 7.6 (6)	185.0 ± 21.5 (8)	170.0 ± 17.6 (6)	132.0 ± 12.4 (4)	72.0 ± 29.9 (4)
Bicarbonate (mg L^{-1})	490 ± 4 (11)	492 ± 6 (6)	489 ± 4 (6)	500 ± 15 (8)	519 ± 15 (6)	539 ± 11 (4)	596 ± 13 (4)
Sodium (mg L^{-1})	301.3 ± 5.8 (11)	301.4 ± 4.4 (6)	299.5 ± 5.3 (6)	303.6 ± 4.5 (8)	303.1 ± 4.6 (6)	293.9 ± 3.9 (4)	289.9 ± 14.3 (3)
Potassium (mg L^{-1})	17.36 ± 2.5 (11)	17.17 ± 3.10 (6)	17.16 ± 3.46 (6)	19.80 ± 3.5 (8)	19.9 ± 3.7 (6)	19.0 ± 3.4 (4)	31.52 ± 21.3 (3)

Table 7 (concluded).

Variable	Depth Zone (m) 0 - 2	3 - 4	5 - 6	7 - 9	10 - 12	13 - 15	> 15
Calcium ($mg\ L^{-1}$)	6.33 ± .11 (11)	6.29 ± .14 (6)	6.41 ± .33 (6)	6.01 ± .33 (8)	6.01 ± .97 (6)	4.55 ± .34 (4)	5.31 ± 1.59 (3)
Magnesium ($mg\ L^{-1}$)	4.12 ± .06 (11)	4.08 ± .07 (6)	4.10 ± .16 (6)	4.09 ± .28 (8)	3.83 ± .10 (6)	3.87 ± .29 (4)	3.98 ± 1.0 (3)
Vanadium ($mg\ L^{-1}$)	.012 ± .004 (10)	.009 ± .005 (6)	.010 ± .003 (5)	.013 ± .005 (8)	.020 ± .002 (6)	.027 ± .003 (4)	.028 ± .011 (3)
Titanium ($mg\ L^{-1}$)	.242 ± .05 (11)	.217 ± .07 (6)	.205 ± .05 (6)	.263 ± .05 (8)	.301 ± .06 (6)	.331 ± .07 (4)	.118 ± .09 (3)
Molybdenum ($mg\ L^{-1}$)	.044 ± .01 (10)	.035 ± .01 (5)	.038 ± .02 (5)	.062 ± .05 (7)	.047 ± .01 (5)	.050 ± .01 (3)	.059 ± .02 (3)
Iron ($mg\ L^{-1}$)	1.19 ± .23 (11)	1.12 ± .16 (6)	1.06 ± .19 (6)	1.56 ± .74 (8)	2.40 ± .35 (6)	3.41 ± .42 (4)	2.95 ± .89 (3)
Manganese ($mg\ L^{-1}$)	.042 ± .004 (11)	.039 ± .003 (6)	.039 ± .002 (6)	.046 ± .02 (8)	.042 ± .004 (6)	.043 ± .009 (4)	.053 ± .037 (3)
Aluminum ($mg\ L^{-1}$)	4.12 ± 1.0 (11)	3.86 ± .60 (6)	3.62 ± .71 (6)	5.50 ± 2.8 (8)	8.59 ± 1.3 (6)	12.51 ± 1.7 (4)	10.60 ± 3.8 (3)
Cadmium ($mg\ L^{-1}$)	.009 ± .003 (10)	.007 ± .004 (6)	.007 ± .004 (6)	.014 ± .008 (8)	.018 ± .005 (6)	.018 ± .007 (4)	.028 ± .015 (3)
Boron ($mg\ L^{-1}$)	1.100 ± .04 (11)	1.096 ± .04 (6)	1.112 ± .04 (6)	1.108 ± .06 (8)	1.127 ± .07 (6)	1.081 ± .05 (4)	1.064 ± .15 (3)
Lead ($mg\ L^{-1}$)	.011 ± .008 (11)	.011 ± .004 (6)	.013 ± .004 (6)	.013 ± .011 (8)	.021 ± .011 (6)	.018 ± .014 (4)	.030 ± .016 (3)

Table 8. Mean values ± standard deviation of variables in water samples from various depth zones in the tailings pond: All Dates.

Variable	Depth Zone (m) 0 - 2	3 - 4	5 - 6	7 - 9	10 - 12	13 - 15	> 15
Temperature (o)	16.89 ± 3.3 10.4 - 22.05 (153)	16.53 ± 3.2 10.3 - 22.0 (96)	16.58 ± 3.2 10.3 - 21.2 (78)	14.15 ± 2.2 9.2 - 18.8 (98)	12.98 ± 1.97 9.3 - 16.5 (75)	12.65 ± 2.01 9.1 - 15.5 (35)	12.77 ± 1.76 10.4 - 14.6 (6)
pH	8.09 ± .17 7.6 - 8.6 (147)	8.07 ± .18 7.6 - 8.5 (84)	8.12 ± .18 7.6 - 8.5 (69)	8.18 ± .20 7.5 - 8.6 (83)	8.24 ± .21 7.8 - 8.7 (66)	8.29 ± .24 8.0 - 8.7 (35)	8.33 ± .28 8.0 - 8.7 (8)
Total Solids (%)	.71 ± .08 .56 - .82 (108)	.70 ± .08 .56 - .84 (43)	.80 ± .22 .58 - 1.53 (38)	1.33 ± .69 .60 - 3.40 (38)	2.61 ± .86 1.01 - 3.68 (29)	4.60 ± 2.8 2.4 - 13.5 (26)	8.52 ± 10.1 6.8 - 38.5 (8)
Suspended Particulate Matter (%)	.57 ± .09 .41 - .70 (111)	.56 ± .09 .43 - .73 (47)	.68 ± .22 .39 - 1.41 (42)	1.22 ± .65 .45 - 3.00 (43)	2.40 ± .83 .81 - 3.50 (30)	4.78 ± 2.9 2.1 - 12.8 (29)	17.50 ± 9.7 6.5 - 36.9 (8)
Bitumen (mg L^{-1})	289 ± 75 132 - 408 (115)	288 ± 67 174 - 390 (47)	392 ± 260 120 - 1475 (43)	720 ± 510 110 - 2000 (43)	1494 ± 630 350 - 2450 (30)	3350 ± 3750 690 - 18700 (30)	23900 ± 22700 5000 - 67500 (8)
Total Organic Carbon (mgC L^{-1})	47.1 ± 7.7 36.5 - 67.5 (115)	48.2 ± 7.7 36 - 65 (48)	48.9 ± 9.4 36 - 75 (42)	50.9 ± 12.0 39 - 103 (41)	51.0 ± 9.4 39 - 76 (29)	52.3 ± 12.5 38 - 88 (28)	62.0 ± 15.3 37 - 80 (7)
Conductivity (μS cm^{-1})	1120 ± 250 240 - 1470 (151)	1190 ± 180 570 - 1524 (96)	1225 ± 160 930 - 1525 (78)	1190 ± 150 970 - 1540 (98)	1180 ± 140 990 - 1470 (75)	1140 ± 120 960 - 1360 (35)	1155 ± 90 1015 - 1270 (6)
Chloride (mg L^{-1})	77.5 ± 6.1 63 - 95 (115)	76.9 ± 6.6 59 - 95 (48)	78.2 ± 5.0 65 - 89 (42)	77.4 ± 7.2 61 - 94 (42)	75.4 ± 7.3 60 - 92 (30)	71.9 ± 6.6 62 - 95 (30)	74.2 ± 12.9 50 - 90 (9)
Sulphate (mg L^{-1})	196.9 ± 14.7 145 - 255 (115)	193.7 ± 19.0 125 - 255 (48)	191.1 ± 12 0 155 - 220 (42)	179.3 ± 24 120 - 220 (42)	152.7 ± 23 105 - 200 (30)	123.1 ± 27 25 - 190 (30)	69.4 ± 52 3 - 175 (9)
Bicarbonate (mg L^{-1})	452 ± 35 320 - 528 (115)	448 ± 40 320 - 510 (48)	451 ± 42 305 - 496 (42)	477 ± 28 397 - 534 (39)	496 ± 22 463 - 539 (29)	496 ± 32 407 - 549 (28)	534 ± 61 452 - 610 (8)
Sodium (mg L^{-1})	281 ± 17 224 - 334 (115)	283 ± 17 237 338 (48)	284 ± 14 250 - 310 (42)	287 ± 17 240 - 327 (42)	285 ± 27 240 - 390 (30)	271 ± 16 250 - 299 (29)	266 ± 43 200 - 315 (8)
Potassium (mg L^{-1})	13.7 ± 5.9 5.8 - 24.6 (115)	13.9 ± 6.5 5.5 - 24.5 (48)	14.8 ± 6.0 6.3 - 24.7 (42)	18.0 ± 6.6 6.5 - 30.5 (42)	20.3 ± 9.2 6.3 - 35.1 (30)	21.3 ± 11.9 6.6 - 46.2 (29)	28.8 ± 14.9 12.7 - 56.1 (8)

Table 8 (continued).

	Depth Zone (m)						
Variable	0 - 2	3 - 4	5 - 6	7 - 9	10 - 12	13 - 15	> 15
Calcium (mg L^{-1})	6.4 ± .5 5.3 - 8.1 (115)	6.2 ± .6 4.8 - 8.0 (48)	5.9 ± .7 4.2 - 7.2 (42)	5.6 ± .9 4.1 - 7.8 (42)	4.8 ± .6 3.7 - 6.5 (30)	4.4 ± .4 3.6 - 5.1 (29)	4.9 ± 1.0 3.7 - 7.1 (8)
Magnesium (mg L^{-1})	4.5 ± .6 3.5 - 6.2 (115)	4.4 ± .6 3.4 - 6.2 (48)	4.5 ± .6 3.2 - 6.7 (42)	4.9 ± .9 3.6 - 8.0 (42)	5.0 ± 1.4 3.0 - 8.8 (30)	5.0 ± 1.3 3.0 - 8.4 (29)	6.2 ± 3.1 3.1 - 11.5 (8)
Vanadium (mg L^{-1})	.026 ± .027 .004 - .169 (103)	.026 ± .019 .000 - .075 (43)	.037 ± .055 .001 - .32 (39)	.041 ± .032 .001 - .114 (40)	.049 ± .028 .010 - .141 (29)	.050 ± .024 .013 - .12 (30)	.074 ± .062 .019 - .18 (8)
Titanium (mg L^{-1})	.301 ± .34 .072 - 2.20 (115)	.293 ± .26 .093 - 1.23 (47)	.312 ± .33 .08 - 1.60 (42)	.334 ± .24 .12 - 1.22 (42)	.343 ± .22 .03 - 1.25 (30)	.276 ± .11 .048 - .51 (30)	.253 ± .20 .057 - .58 (8)
Molybdenum (mg L^{-1})	.065 ± .04 .004 - .201 (110)	.075 ± .05 .002 - .224 (44)	.077 ± .10 .01 - .63 (39)	.081 ± .05 .02 - .21 (40)	.083 ± .05 .02 - .21 (29)	.078 ± .03 .04 - .14 (29)	.100 ± .05 .04 - .19 (8)
Iron (mg L^{-1})	3.06 ± 3.4 .87 - 22.8 (115)	2.87 ± 2.3 .89 - 12.8 (48)	3.67 ± 3.5 .88 - 17.6 (42)	5.43 ± 4.2 .98 - 15.1 (42)	7.39 ± 4.8 1.7 - 21.9 (30)	8.60 ± 4.8 2.3 - 21.5 (30)	12.49 ± 12.1 2.0 - 33.4 (8)
Manganese (mg L^{-1})	.051 ± .03 .01 - .18 (115)	.049 ± .02 .03 - .11 (47)	.062 ± .05 .04 - .34 (42)	.060 ± .02 .035 - .12 (41)	.067 ± .03 .02 - .14 (30)	.074 ± .04 .03 - .23 (30)	.091 ± .06 .02 - .18 (8)
Aluminum (mg L^{-1})	11.7 ± 14.8 3.1 - 98.7 (115)	11.1 ± 10.5 3.2 - 55.5 (48)	14.4 ± 16.1 2.9 - 78.3 (42)	20.5 ± 17.0 3.2 - 62. (42)	26.3 ± 18.6 5.6 - 90.9 (30)	28.7 ± 15.4 7.7 - 66.0 (30)	37.9 ± 36.2 7.1 - 101.5 (8)
Cadmium (mg L^{-1})	.025 ± .022 .001 - .125 (108)	.030 ± .034 .000 - .159 (46)	.025 ± .026 .002 - .15 (39)	.032 ± .031 .002 - .15 (41)	.030 ± .026 .001 - .124 (29)	.032 ± .022 .005 - .088 (27)	.028 ± .015 .012 - .048 (6)
Boron (mg L^{-1})	.890 ± .15 .353 - 1.223 (115)	.881 ± .22 .344 - 1.32 (48)	.879 ± .22 .34 - 1.19 (42)	.876 ± .25 .35 - 1.28 (42)	.932 ± .24 .37 - 1.29 (30)	.881 ± .19 .77 - 1.14 (30)	1.135 ± .25 .92 - 1.52 (8)
Lead (mg L^{-1})	.037 ± .032 .001 - .173 (110)	.042 ± .045 .001 - .226 (47)	.035 ± .033 .004 - .19 (38)	.043 ± .041 .001 - .21 (41)	.046 ± .03 .002 - .13 (28)	.046 ± .03 .004 - .127 (28)	.045 ± .03 .018 - .07 (7)

Table 8 (concluded).

Variable	Depth Zone (m) 0 - 2	3 - 4	5 - 6	7 - 9	10 - 12	13 - 15	> 15
Nitrite (mg-N L^{-1})	.025 ± .02 .004 - .10 (115)	.026 ± .03 .005 - .22 (48)	.025 ± .02 .005 - .09 (42)	.030 ± .03 .006 - .14 (42)	.034 ± .03 .01 - .17 (30)	.044 ± .06 .006 - .37 (30)	.079 ± .08 .02 - .23 (9)
Nitrate (mg-N L^{-1})	.039 ± .04 .003 - .142 (80)	.042 ± .05 .001 - .18 (37)	.035 ± .04 .003 - .14 (32)	.024 ± .04 .003 - .14 (35)	.029 ± .05 .003 - .15 (27)	.029 ± .04 .003 - .14 (25)	.031 ± .03 .003 - .10 (8)
Ortho Phosphate (mg-P L^{-1})	.122 ± .11 .03 - .52 (115)	.125 ± .10 .04 - .47 (48)	.139 ± .14 .03 - .68 (42)	.169 ± .19 .03 - .90 (41)	.187 ± .18 .06 - 1.0 (30)	.184 ± .13 .08 - .55 (30)	.299 ± .24 .07 - .85 (9)
Ammonia (mg-N L^{-1})	5.7 ± 1.5 4.9 - 7.9 (4)	4.9 ± .1 4.8 - 4.9 (2)	6.0 ± 1.9 4. 8- 8.2 (3)	4.2 ± .6 3.7 - 4.9 (3)	4.4 ± 2.9 1.9 - 7.5 (3)	3.7 (1)	
Phenol (mg L^{-1})	.29 ± .07 .21 - .41 (16)	.28 ± .06 .22 - .38 (5)	.28 ± .04 .21 - .32 (5)	.29 ± .04 .23 - .32 (4)	.39 ± .21 .14 - .65 (4)	.21 ± .08 .15 - .26 (2)	N.A.

active tailings discharge points showed some effects, especially in temperature profiles.

Since it is difficult to generalize for all the variables studied, each of the major variables will be discussed individually. For each of these variables, their specific distribution within the pond, variability with depth and time and correlations with other variables are examined. Similarities will become evident, with generally two types of properties; those which are conservative and little affected by interaction with the high solids in the pond waters, and those which are nonconservative and show a strong correlation to the solids content.

TEMPERATURE

Temperature distributions are useful in estimating the extent of influence and dynamics of mixing within the tailings pond. The depth profiles of temperature, averaged into one meter intervals, for each of the sampling days is shown in Figure 6 and Figures 7-12. A zone of rapid temperature change (thermocline) was well defined on each sampling day, but the depth where this zone began did vary during the study period; shallowest on 30 April (about 4-5 m), deepest on 25 August (6-7 m). Generally, the surface or well mixed zone (0-6 m) was relatively isothermal, with a wide range of temperatures being recorded during the study period (4-6° on 4 November to 20-22° on 8 and 22 July). However, when compared to this surface zone, temperatures in the deep zone (>9 m) showed little structure with depth, and underwent a smaller

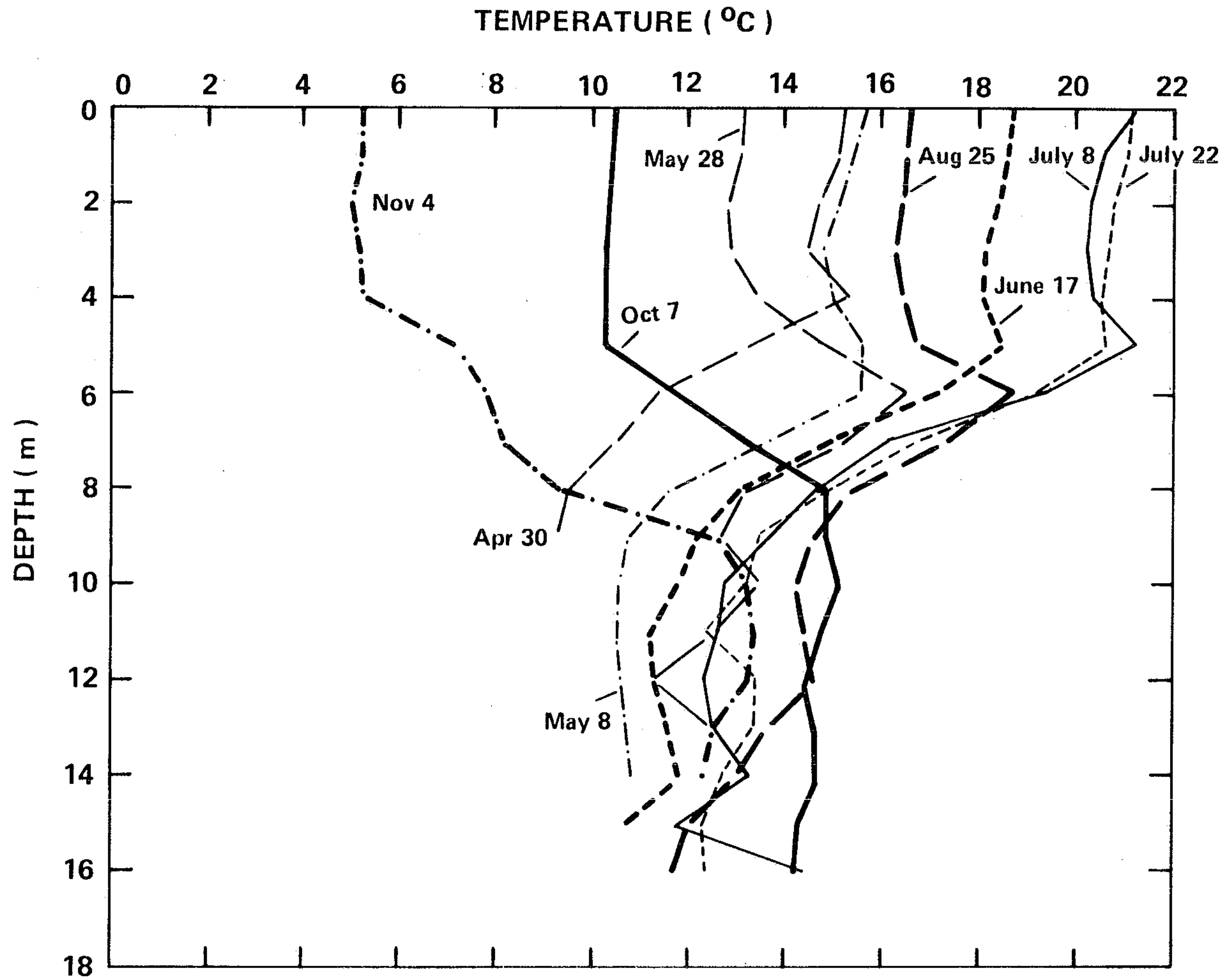

Figure 6. Depth profiles of temperature for each sampling day.

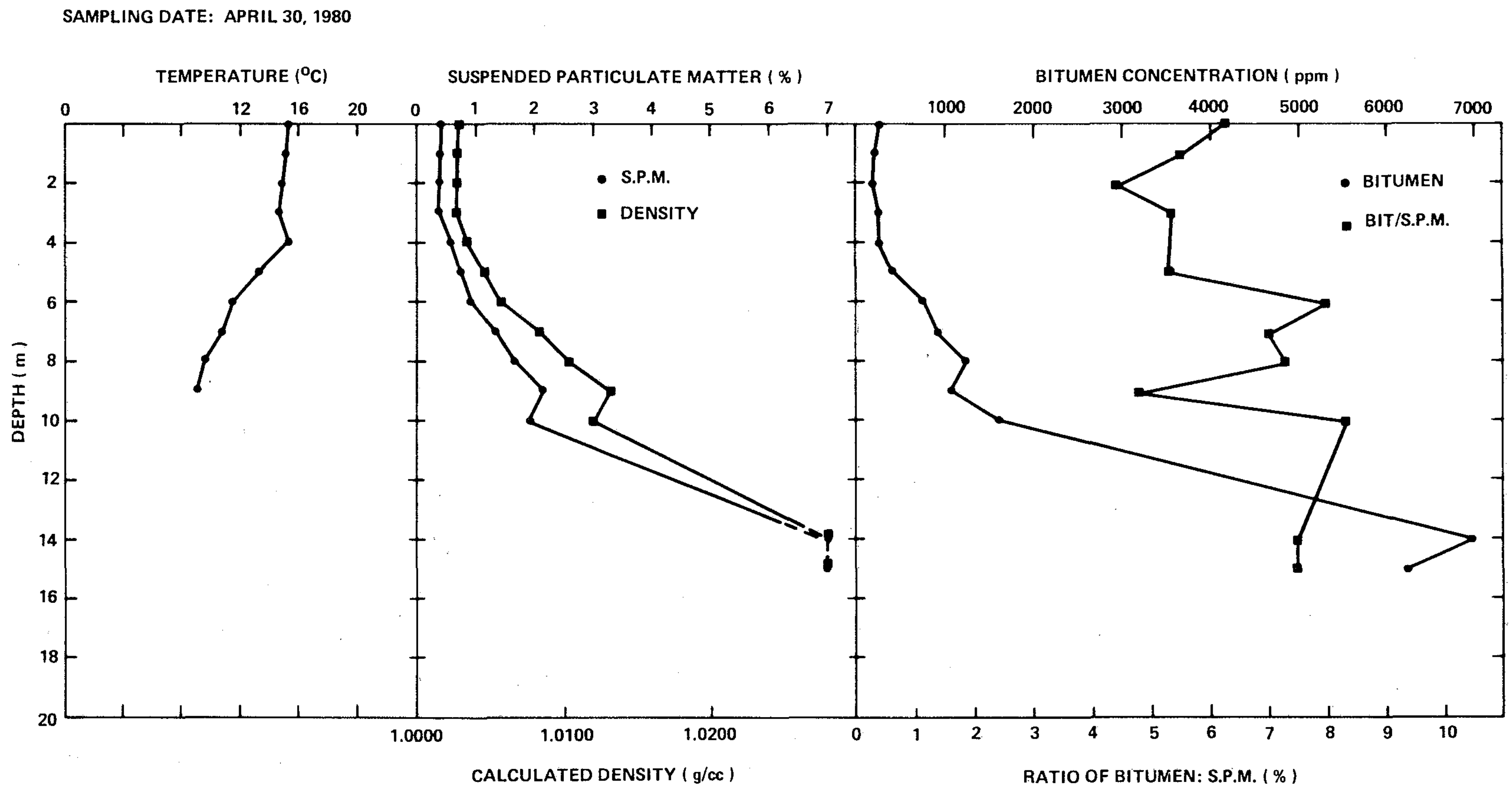

Figure 7. Depth profiles of temperature, SPM, and bitumen values, calculated densities, and the ratio of bitumen:SPM observed on 30 April.

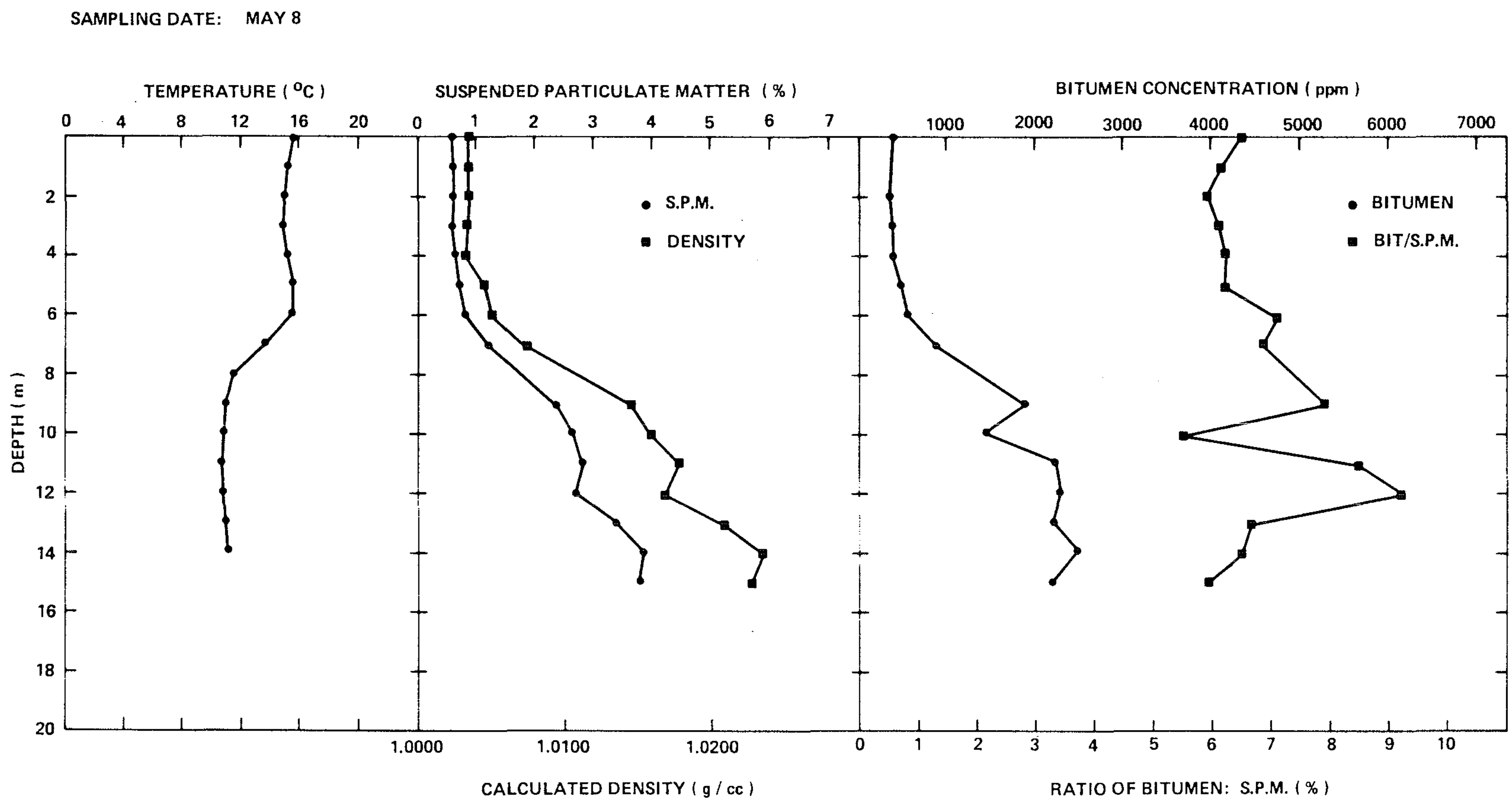

Figure 8. Depth profiles of temperature, SPM, and bitumen values, calculated densities, and the ratio of bitumen:SPM observed on 8 May.

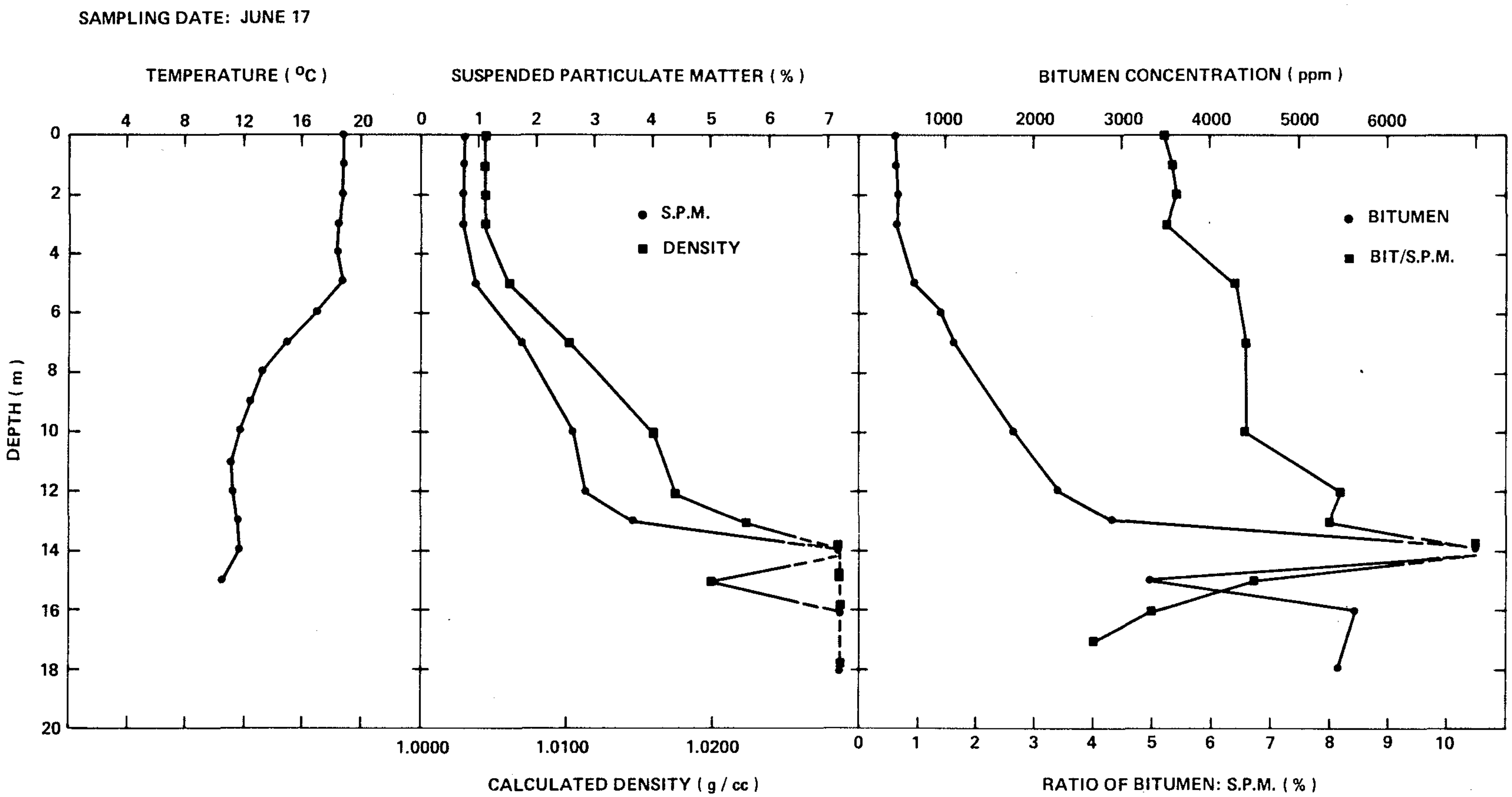

Figure 9. Depth profiles of temperature, SPM, and bitumen values, calculated densities, and the ratio of bitumen:SPM observed on 17 June.

SAMPLING DATE: JULY 22

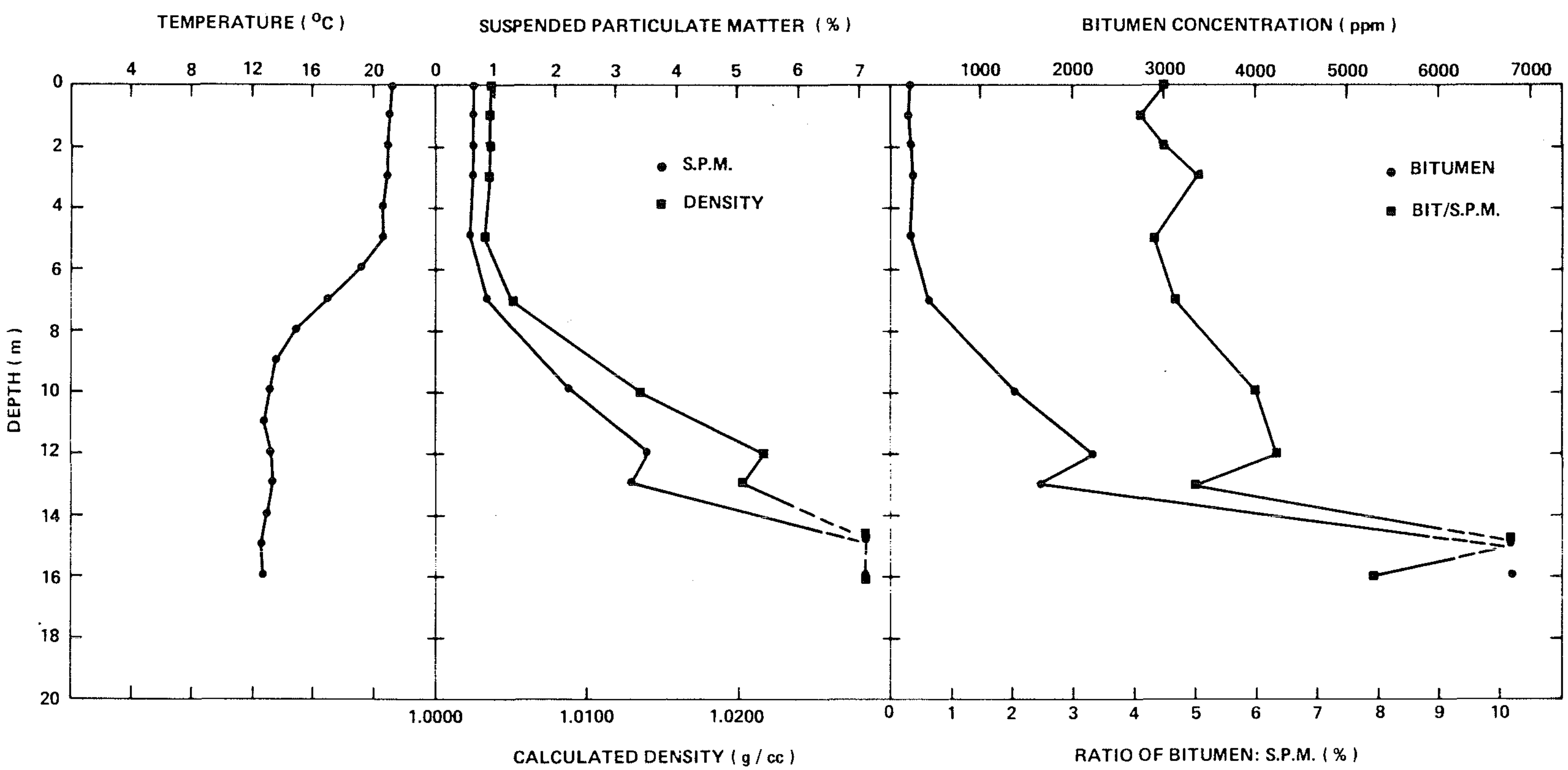

Figure 10. Depth profiles of temperature, SPM and bitumen values, calculated densities, and the ratio of bitumen:SPM observed on 22 July.

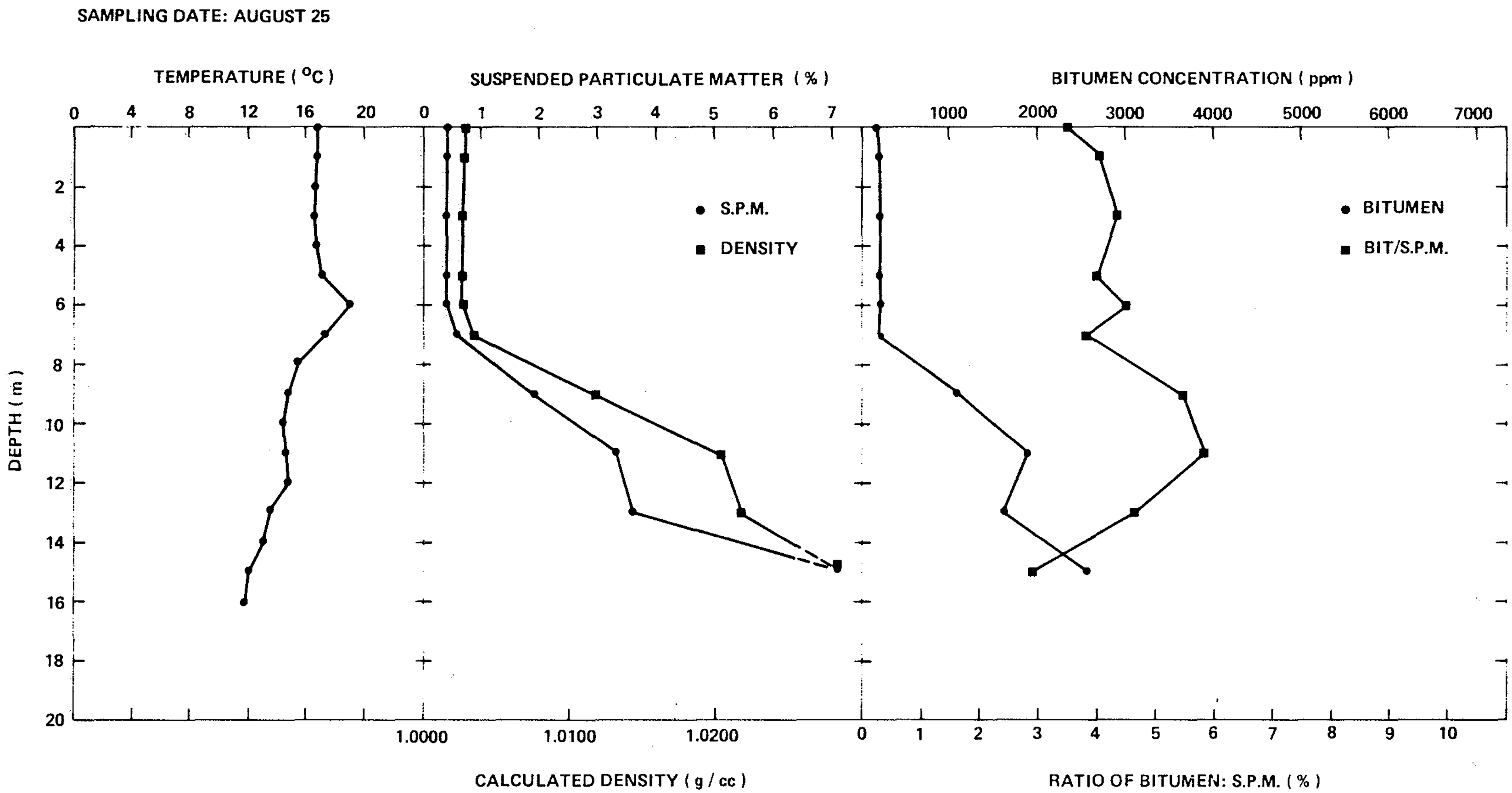

Figure 11. Depth profiles of temperature, SPM, and bitumen values, calculated densities, and the ratio of bitumen:SPM observed on 25 August.

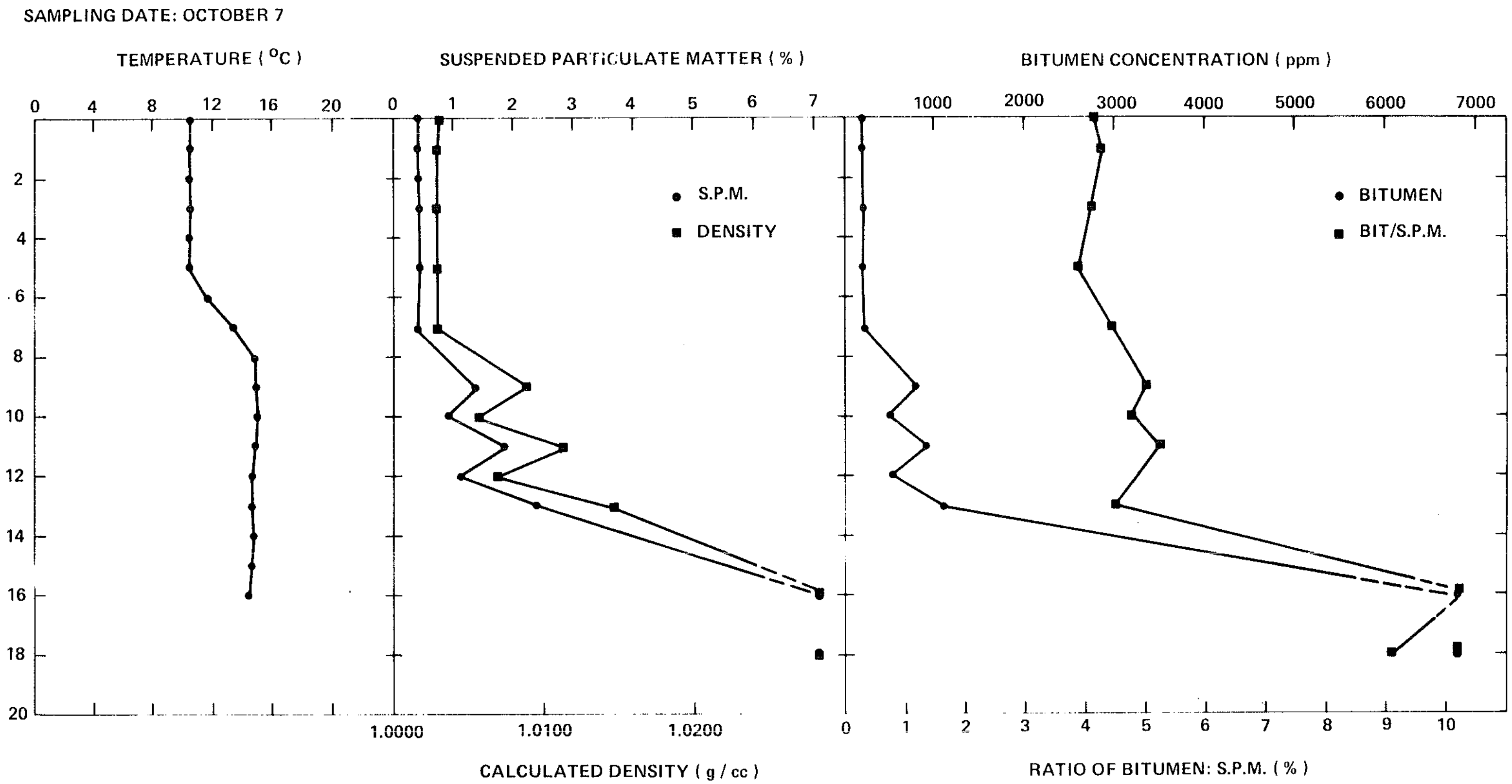

Figure 12. Depth profiles of temperature, SPM and bitumen values, calculated densities, and the ratio of bitumen:SPM observed on 7 October.

range of changes (9-10° on 30 April to 14-15° on 7 October), (Fig. 6).

In Figure 13, weekly averages of maximum and minimum air temperatures at Fort McMurray Airport, recorded by Atmospheric Environment Service over the period of March to December, are plotted. Also in Figure 13, the mean temperatures measured in the waters of 4 depth zones (0-5, 6-9, 10-15, and >15 m), of the tailings pond are also shown. A good correlation between the well mixed zone (0-5 m) and the mean atmospheric temperatures is evident. In the deeper zones (10-15 and >15 m), a slow but significant warming trend during the study is observed. However, the rate of change and range of temperatures observed in this deep water was lower than observed in the surface zone (Table 8).

In natural waterbodies, effectiveness of vertical mixing is influenced by density effects of thermal changes; isothermal or unstable profiles. On 28 May, the tailings pond could be considered isothermal (Fig. 6). On 7 October and 4 November, the tailings pond was thermally unstable (colder water over warmer water). Both of these situations could have resulted in vertical mixing throughout the pond. However, because of the density gradients influenced by high suspended solids concentrations in the pond, simple thermal instability (cold over warm) was not sufficient to initiate such vertical mixing between low solids surface and high solids deep zones. This means that there will be no spring or fall overturn phenomena within the tailings pond since the density differences are too great to allow the cooled dense water (4°) from surface to mix with the warmer water (12-15°) in the deeper zones of the pond below the pycnocline (>9 m).

The rate of change of temperatures within each of the depth zones (Fig. 13) is different and indicates only slow exchange between the zones. The high density waters below 9 m can be considered a heat sink. Even during the winter period, much of the heat in this zone will be retained. This was evident by the high temperatures recorded in deeper waters on 30 April, shortly after ice breakup ($\simeq 9^{O}$). This heat source during ice cover periods would help to explain the 2-3 week earlier spring ice breakup (early April, 1980) and the later fall freeze-up (1 December, 1980) when compared to surrounding lakes.

The vertical mixing between water zones that form within the tailings pond does not appear to be an advective process. Mixing between these zones appears to be more a process of diffusion. Thus, rates of mixing will be quite low. For these reasons, the deeper water zones will retain much of their thermal characteristics throughout the year and undergo only slow gradual changes.

SUSPENDED PARTICULATE MATTER (S.P.M.)

The concentration of suspended particulate matter (SPM) in tailings pond waters was high (>.4%), (Tables 2-8), when compared to natural waters (usually >.1%). The SPM values in the surface zone (0-7 m) were

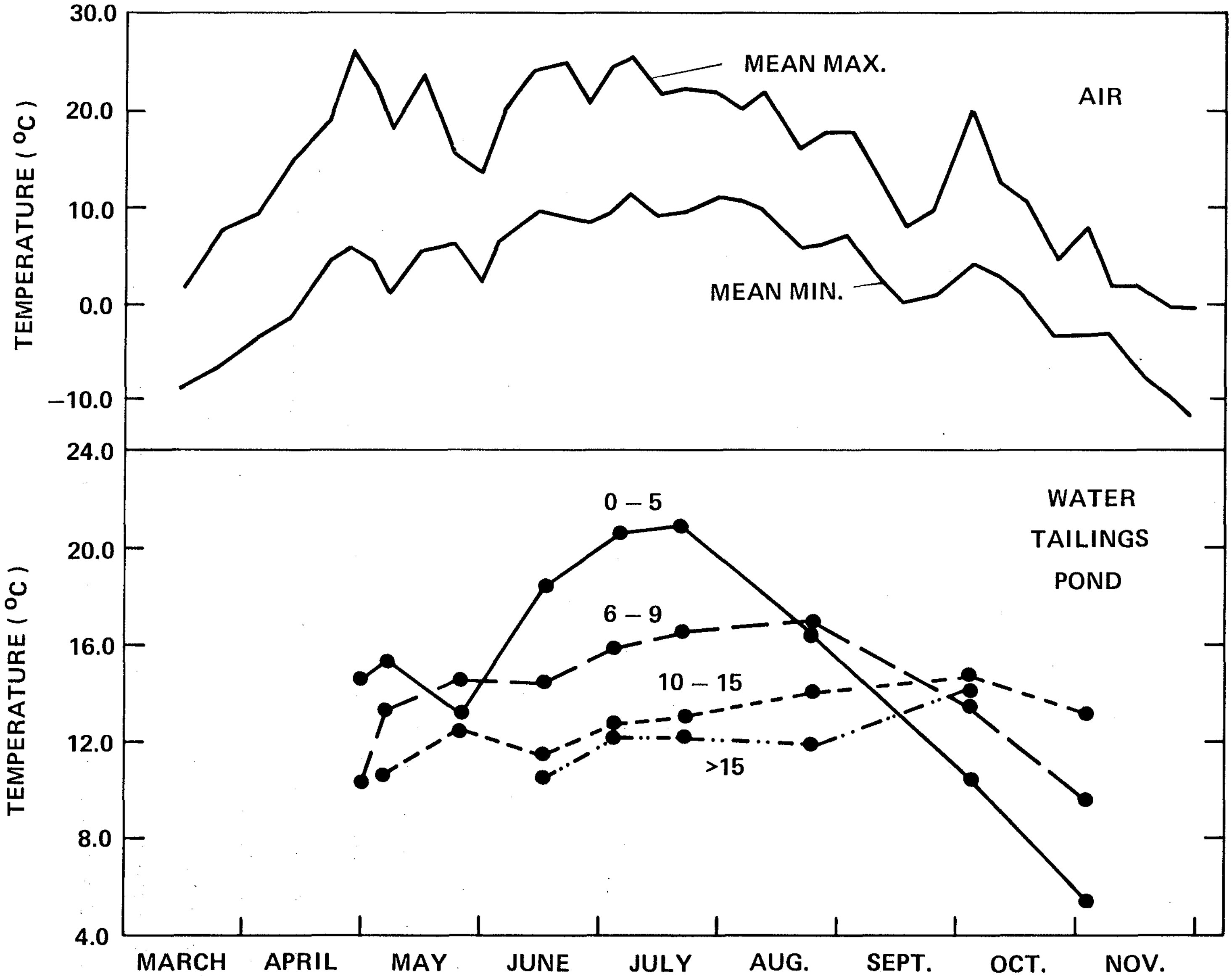

Figure 13. Mean high and low weekly air temperatures plotted for 1980. Temperatures of tailings pond waters averaged into depth zones for each of the sampling dates are plotted.

relatively low and uniform while in the deeper zone (>9 m) were high and variable. The SPM values, averaged into 1 m depth intervals for all sampling dates, are plotted in Figure 14. In the upper 7 m, mean SPM concentrations were generally less than 1%, while below 9 m, mean concentrations ranged from 2-25%. The depth profiles of SPM for each of the sampling days is presented in Figures 7-12. Similar profiles are noted for each day; 0-5 m - low values with little variability (0.4-0.7%), 6-9 m - zone of rapid increase (0.5-2.4%), 10-15 m - high values increasing with depth (1-10%), and >15 m - sludge zone (4-37%).

The SPM values, averaged into depth zones (0-5, 6-9, 10-15, >15 m), were plotted versus time to show seasonal trends (Fig. 15). Variations in SPM concentrations in the tailings pond waters during the study were observed. The mean SPM values in the surface zone (0-5 m) were highest during June and July (0.6-0.7%). Lower values were measured prior to and after the mid summer highs (0.45-0.60%). The variability of results (Standard Deviation (S.D.)/Mean) within this surface zone was low throughout the study (2-6%), This is an indication that the surface zone is well mixed. This low concentration, well mixed zone was deepest (≃7 m) during later sampling periods in August and October. Below this well mixed zone, rapidly increasing values with high variability were noted (S.D./Mean = 10-40%). This zone corresponds to the area of the thermocline described previously in the 6-9 m depth zone.

The specific gravity or density of the tailings pond waters is related to the SPM concentration. By assuming that the density of

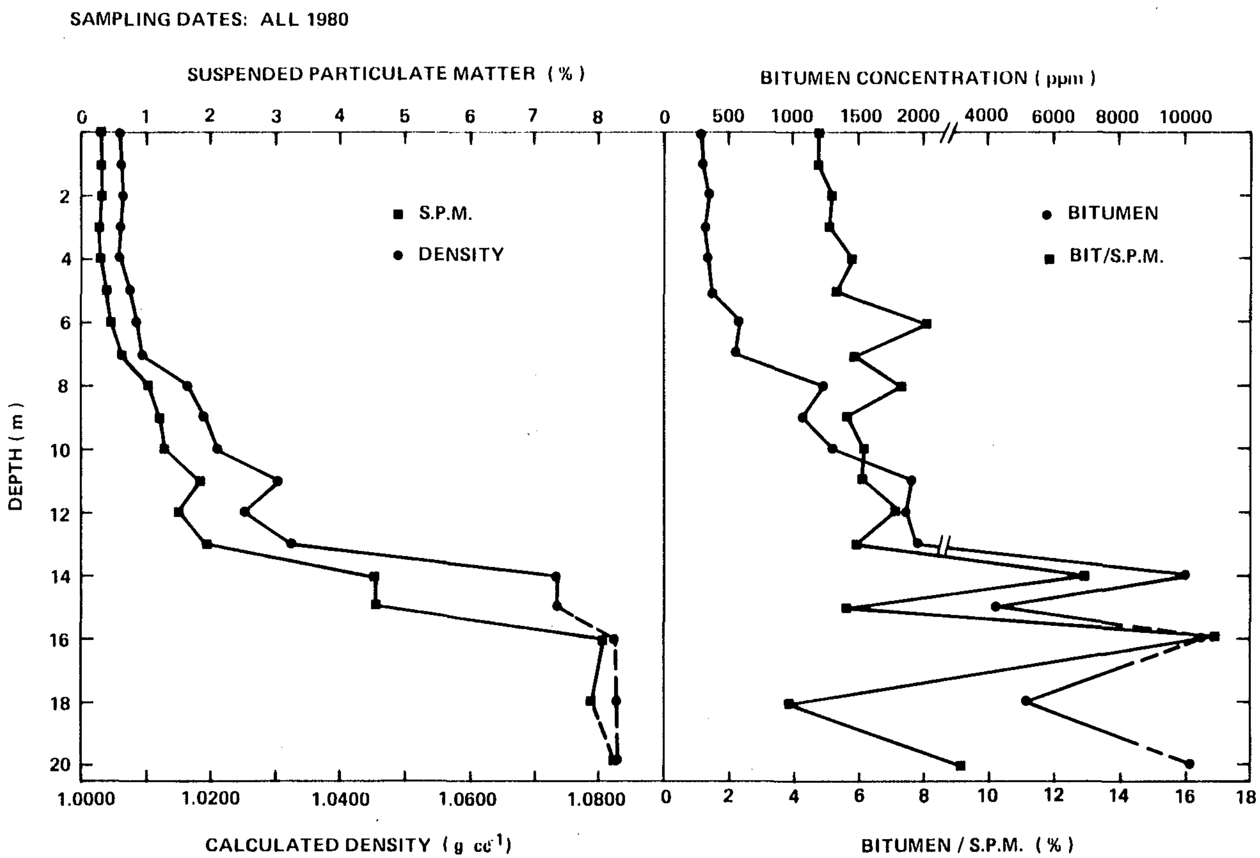

Figure 14. Profiles of mean SPM and bitumen values within the tailings pond for the 1980 study. The calculated density and Bitumen:SPM ratio are also plotted.

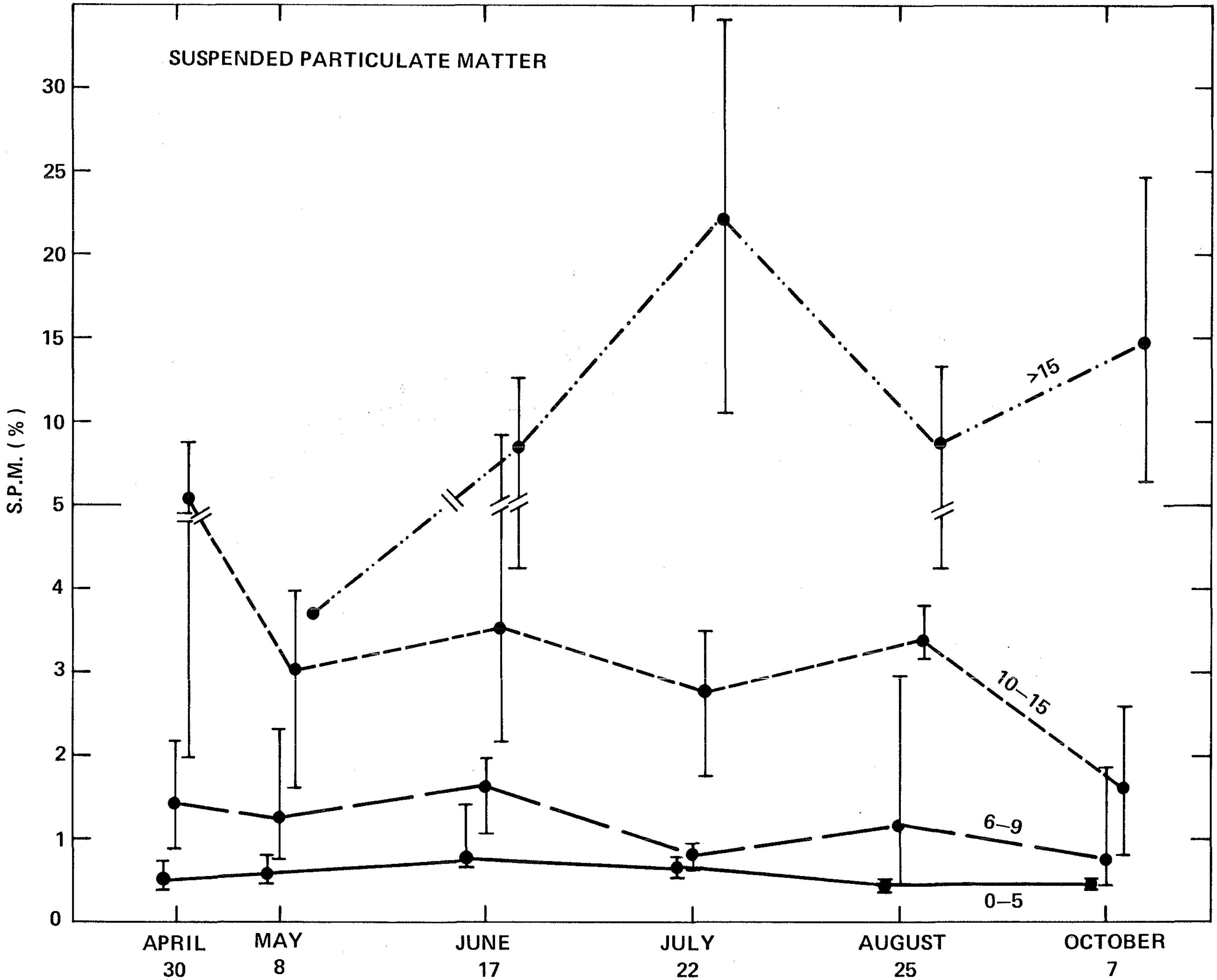

Figure 15. SPM values averaged into depth zones (0-5, 6-9, 10-15, >15 m) plotted versus date of sampling. Bars show the range.

water is 1.000 g cc^{-1} and the density of fines is 2.60 g cc^{-1} (Fuhr *et al.*, 1977), the density of tailings waters can be calculated with the following formula by using the measured SPM.

$$\text{Density of Tailings Pond Water} = \frac{\text{wt SPM} + (V_s - \frac{\text{wt SPM}}{\rho_{SPM}})}{V_s}$$

$$= \text{g cc}^{-1}$$

wt SPM - Measured suspended solids in tailings water sample

V_s - Sample volume expressed as water

$$= \frac{\text{Total Sample Mass}}{\text{Density of Pure Water}}$$

Assume: Density of Water ≃ 1.0000 g cc^{-1}

ρ_{SPM} - Density of fines ≃ 2.60 g cc^{-1}

This density calculation can be given in a more simplified version as shown in Appendix 3. The calculated density values compared well with measured densities but were slightly lower (about 0.1%). However, the relative distribution of densities will be similar.

Depth profiles of densities are plotted in Figure 14. The pycnocline (zone of rapidly changing density) is found in the 6-9 m zone. At this level, densities change from about a mean of 1.0030 g cc^{-1} above this zone to greater than 1.0120 g cc^{-1} below it. Below 13 m, average densities were greater than 1.02 g cc^{-1} with most values in the range of 1.04 - 1.15 g cc^{-1} . This high density in the zone below 9 m interferes with easy mixing between surface and deep waters. These densities differences are too great for simple thermal instabilities that occur in the spring and fall, to overcome.

The mass of the suspended matter in the tailings pond at present can be calculated using the measured mean SPM concentration and estimating the tailings pond volume in each depth zone (Table 9). At the present estimated volume of the pond of 130 x $10^6 m^3$, a suspended particle load of about 3.4 x 10^6T is calculated. At an extraction feed rate of 10^6T per week of tar sand, of which about 12% is fines (clay and sand <44 μm), (Fuhr *et al.*, 1977), the calculated suspended load would represent the input from tailings of about 28 weeks.

$$\frac{\text{Calculated Total Suspended Load}}{\text{Estimated Tailings Input of fines } (<44\ \mu m)} = \frac{3.4 \times 10^6 T}{0.12 \times 10^6 T \text{ week}^{-1}} = 28 \text{ weeks}$$

This can be considered the residence time of sand and clay matter of less than 44 μm. If only fines of less than 5 μm (about 4% of total) are considered, a residence time of about 85 weeks is calculated. The SPM values and their distributions observed during this study indicate that settling is more rapid than indicated by the residence times. In the tailings pond, a rapid and effective settling process, particularly in the surface zone, is occurring. The tailings pond seems to be operating at steady state conditions.

Over the period of this study, a seasonal variation in the fines (<44 μm) content within the surface zone (0-5) was calculated (Table 9b). The tar sand extraction feed to the plant was relatively constant during this period (≃10^6T per week). Thus the rate of tailings disposal to the pond would also be relatively constant. However, no increase

Table 9a. Calculated quantity of fines (<44 μm) suspended in the Tailings Pond in 1980.

Depth Zone (m)	Estimated Volume (m^3)	Mean SPM Concentration (Kg/m^3)	Mass of SPM (Kg)
0 - 5	65×10^6	5.3 ± 1.3	377×10^6
6 - 9	32×10^6	12.0 ± 6.0	384×10^6
10 - 15	25×10^6	30.0 ± 15.0	750×10^6
>15	15×10^6	125.0 ± 85.0	1875×10^6
Total	$137 \times 10^6 m^3$		$3.4 \times 10^9 Kg$ $= 3.4 \times 10^6 T$

Table 9b. Calculated amount of fines (<44 μm) suspended in the surface zone (0-5 m) of the Tailings Pond during 1980.

Sampling Date	Estimated Volume of Surface Zone (m^3)	Mean Water Temperature (o)	Mean SPM Concentration (Kg/m^3)	Mass of SPM in Surface Zone (10^6Kg)
April 30	65×10^6	14.7 ± .7	5.0 ± 1.1	325
May 8	65×10^6	15.3 ± .5	5.7 ± 0.7	371
June 17	65×10^6	18.4 ± .6	7.4 ± 1.5	480
July 22	65×10^6	20.9 ± .5	6.1 ± 0.2	397
August 25	65×10^6	16.6 ± .5	4.6 ± 0.2	299
October 7	65×10^6	10.4 ± .1	4.8 ± 0.2	312

in the SPM values, measured in the surface zone, was seen as a response to this steady input. A correlation between tailings input and measured SPM would be expected unless the material being added quickly settled from the water column. The SPM loads in the surface zone increased to a maximum in June and July (400-500 x 10^3T) but dropped significantly in August and October (300-400 x 10^3T), (Table 9b). The observed SPM content seems to be correlated to the temperature of the tailings pond waters with the highest SPM concentrations (mean $\simeq$ .6-.7%) during the period of warmest waters (18-21°). Such a seasonal variation in SPM may be the result of a relationship between the stability of oil:water: sand emulsion and water temperature. During this present study, no steady buildup of SPM values in the surface zone was observed as would be expected if the fines were neutrally buoyant in the tailings pond and thus not actively sinking. Even in the deeper waters (10-15 m) where a buildup in fines is to be expected (Fuhr *et al.*, 1977), no significant increase was found with mean SPM values in October (1.6%) much lower than those observed in earlier sampling periods (2.7-3.5%). This may be an indication that the flocculation and settling of the SPM to the sediment may be a more dynamic process than expected and may be regulated by temperature conditions which affect emulsion stabilities. If this were the case, the tailings pond with respect to SPM may be a steady-state system and SPM values may not increase over a certain level.

At no time during this study did the quality of the tailings pond waters with respect to SPM concentrations become limiting to maximum reclaim for extraction processes (SPM values <2.9%, Schock *et al.*, 1979). With the temperature dependence of SPM values that was observed during 1980, the optimum period for maximum recovery of lowest solids content will be late August and into the fall. During this time, the zone of lowest SPM concentrations (≃.5%) was about 7 m deep, which would mean about 80-90 x $10^6 m^3$ of potential high quality reclaim water. In spring and early summer, the SPM values were higher and the zone of lowest values (<.7%) was found in only the top 5 m. This would represent about 50-65 x $10^6 m^3$ of potential high quality reclaim water.

TOTAL SOLIDS

The total solids were determined gravimetrically after drying an aliquot of the sample of tailings pond waters. The total solids contain both dissolved and suspended solids. Of this total solids concentration, the suspended solids make up about an average of 85-90%. Thus, the distribution and trends described previously for the SPM fraction will be very similar for the total solids. High correlation between the SPM and total solids values for each sampling day and for all the observations during the study were calculated (r=.99). An increase in the SPM content of the total solids from the surface (0-6 m) zone (83%) to deeper (>7 m) zone (93%) was found. This indicates that the dissolved solids fraction of the total solids decreased with depth even though the absolute amount of dissolved solids increased. The dissolved solids averaged about 0.12 ± .02 in surface zone (0-6 m), with higher values of about 0.23 ± .06% in the deeper waters (7-15 m). In bottom waters, within 2 m of sediment, very high dissolved solids values over 1% were calculated. However, the presence of a high suspended content of colloidals makes it difficult to accurately differentiate the dissolved and particulate species.

BITUMEN (SUSPENDED)

At present, the efficiency of bitumen extraction in the plant is about 87-88%. At the production rate averaged during the study period, nonextracted bitumen would be added to the tailings pond at about 10-15 x 10^3 bbls per day. This bitumen, lost to the tailings pond, has three possible fates:

1. it may be trapped and lost with coarse sand used for dyke and beach building;
2. it can float on pond surface until deaerated (density of bitumen is about 1.01-1.02 g cc^{-1});
3. it can be tied up in suspensions or emulsions within the pond as a fines:water: bitumen mixture.

Ultimately the bitumen will end up in the sediment or be degraded by microbial action.

The bitumen, which is discussed in this study as the suspended fraction is that which is in suspension within the water column. Emulsions will result from the suspension of fines, which are "water wet" from extraction process, and bitumen in the combined tailings.

Also, suspended bitumen will form by the physical or chemical breakdown of existing bitumen mats. The concentration of suspended bitumen was measured at various depths and locations in the tailings pond (Tables 2-8). Profiles of bitumen values, averaged over 1 m depth intervals, is shown for each of the sampling dates in Figures 7-12. Depth profiles of bitumen concentrations are similar to those of SPM values. Low bitumen concentrations with little variability (300 ± 125 mg L^{-1}) are found in the surface zone (0-5 m). This zone overlies a region (6-9 m) of rapidly increasing values (710 ± 500 mg L^{-1}). Bitumen values below 10 m are generally high (Range: 400-68000 mg L^{-1}) and variable (note, deeper water samples are quite heterogenous with high solids concentrations and nondispersed bitumen in globules. This makes accurate subsampling difficult).

Seasonal trends of bitumen concentrations, averaged into depth zones, are shown in Figure 16. The highest surface zone (0-5 m) concentrations of bitumen were found in May, June and July (200-1500 mg L^{-1}), while lower values with less variability were observed during the period of cooler water in April, August and October (120-400 mg L^{-1}).

There is a high correlation between SPM and bitumen values. When the bitumen:SPM ratio is plotted, relatively uniform depth profiles (Bitumen/SPM = 4-8%) for each of the sampling dates were calcualted (Figure 7-12). A slight increase in this ratio was noted with increasing heterogeneity in the deeper samples. Also, a seasonal trend was evident, with a steady decrease in the calculated ratios from the

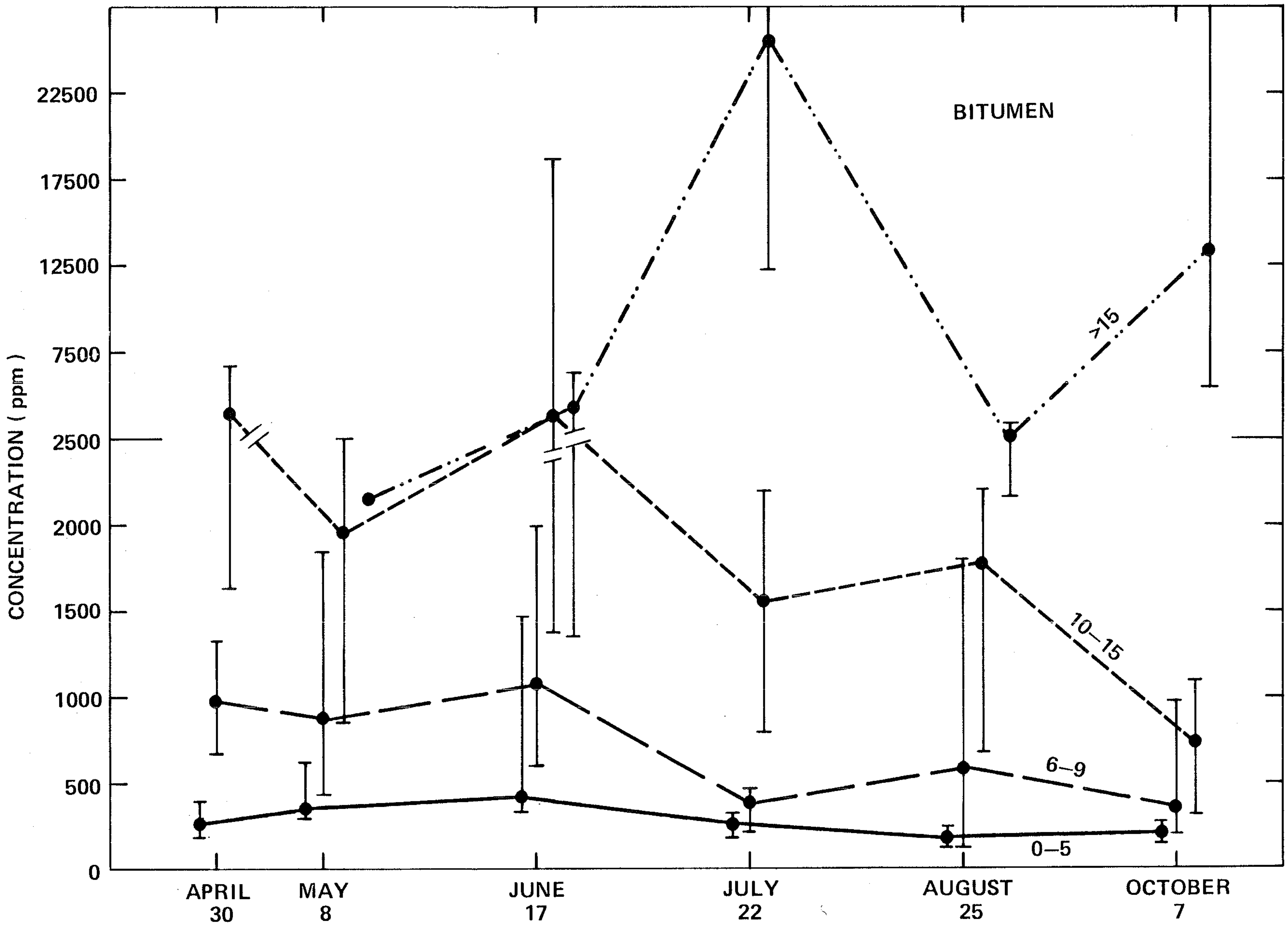

Figure 16. Bitumen concentrations averaged into depth zones (0-5, 6-9, 10-15, >15 m) versus date of sampling. Bars show range.

beginning to the end of the study period (Table 10). In the top 11 m, average bitumen/SPM ratios for all results is about 5.9 ± 1.0%. In the deeper waters, these ratios were higher and more variable (8.9 ± 4.7%). In most samples (except the nonhomogeneous samples with floating bitumen) a high linear correlation (r = .95) of the bitumen (0 - 3000 mg L^{-1}) with SPM (0-6%) is found (Fig. 17). The slope of this line is about 6% (600 mg L^{-1} bitumen per 1% SPM). This slope is similar to what was calculated as the bitumen/SPM ratios of about 6% shown in Table 10. For each of the sampling days, the calculated linear correlation of bitumen plotted versus SPM was high (r > .95). There were some variations in observed slope during the study period; these were similar to those calculated as bitumen:SPM ratios and indicated a trend to lower ratios during the study.

The bitumen concentrations, averaged into depth zones in which the volumes were estimated, were used to calculate the amount of bitumen suspended within the tailings pond (Table 11). The quantity of bitumen was determined to be about 3 x 10^5T. The quantity of bitumen represents about 125 days of input from combined tailings, with plant production of synthetic crude running at 100,000 bbls per day. This relatively long residence time seems to indicate that settling of the suspended bitumen is slow. It should be noted that this calculated suspended load does not include either the floating bitumen mat or bitumen entrained in beaches or dykes.

Bitumen has a density of about 1.01-1.02 g cc^{-1} at ambient

Table 10. Ratio of Bitumen:SPM for Tailings Pond Waters during 1980.

	STATISTICS CALCULATED FROM BITUMEN:SPM PLOTS*		BITUMEN:SPM RATIOS (%)	
DATE	R	Slope	0-11 m	>11 m
April 30	.93	7.26	6.2 ± 1.4	7.5
May 8	.96	6.47	6.6 ± 0.8	6.9 ± 1.2
June 17	.93	5.93	5.8 ± 0.7	9.7 ± 5.8
July 22	.96	5.86	4.7 ± 0.6	7.6 ± 2.6
August 25	.96	5.61	4.5 ± 0.8	3.8 ± 1.2
October 7	.99	4.72	4.5 ± 0.5	11.4 ± 10.7
ALL	.95	5.98	5.9 ± 1.0	8.9 ± 4.7

*Linear Plot of Bitumen (0-3000 ppm) versus SPM (0-6%).

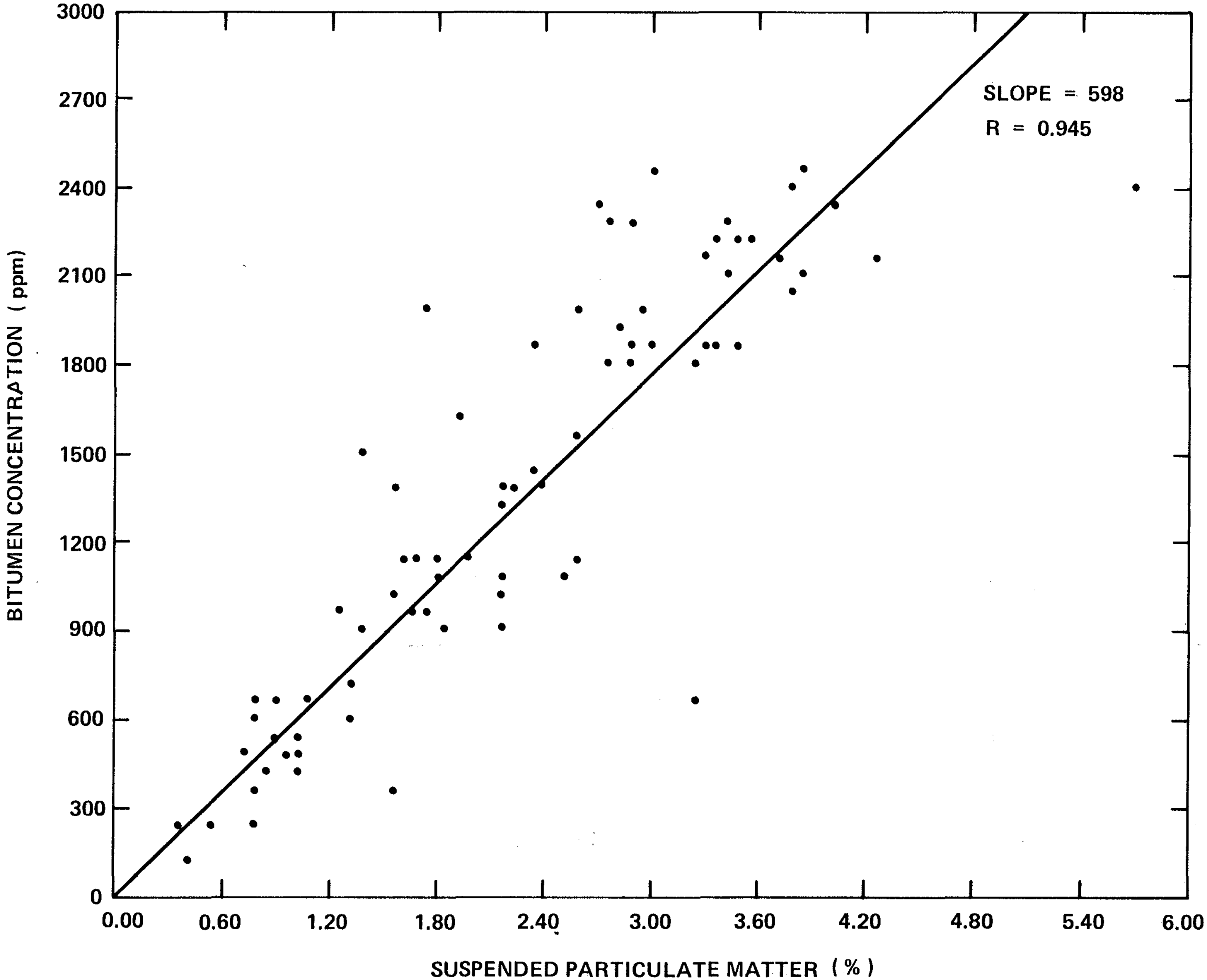

Figure 17. Plot of Bitumen concentration (0 - 3000 ppm) versus Suspended Particulate Matter (0-6%).

Table 11. Calculated amount of bitumen suspended in depth zones of the Tailings Pond in 1980.

Depth Zone (m)	Estimated Volume (m^3)	Mean Bitumen Concentration (Kg/m^3)	Mass of Bitumen (Kg)
0 - 5	65×10^6	.30 ± .1	19.5×10^6
0 - 9	32×10^6	.71 ± .5	22.7×10^6
10 - 15	25×10^6	2.10 ± 2.5	52.5×10^6
>15	15×10^6	13.50 ±18.3	202.5×10^6
Total	137×10^6		297.0×10^6 or 297.0×10^3T

temperatures. However, when nonextracted bitumen in the tailings is delivered to the pond, it is well aerated and some of it will float as mats on the pond (mean density of surface waters averages about 1.003 g cc^{-1}). When dearerated, these bitumen mats with densities greater than 1.003 g cc^{-1} should sink, either to the bottom or to a density zone where it would be neutrally buoyant. From earlier calculations, a density of 1.01-1.02 g cc^{-1} (approximate density of pure bitumen) will be found in tailings water of 1.6-3.2% SPM concentration. This level of SPM is found at an average of 8-11 m (about 296 m contour in Figure 2). This is about the depth where the pycnocline was observed on each of the sampling days. Densities in deeper waters (>11 m) are generally greater than 1.02 g cc^{-1} with a mean density of greater than 1.04 g cc^{-1} below 13 m. Thus, if bitumen were sinking as a mat after deaeration and resulting density increase, it would have difficulty sinking below 11 m. This should result in the formation or existence of subsurface bitumen mats at or below the 296 m contour of the tailings pond (pond elevation during study about 306-307 m). This is the area of the former Beaver Creek valley. During sample collection (hydrocasts) in these areas, such subsurface mats were observed. The size and thickness of these mats were not quantified, but appeared to be quite large, particularly in the early spring and fall periods. These subsurface mats may prove to be a major sink of bitumen, until it is lost to the sediment. Such a loss should probably occur at the 295-300 m contour. Also, the water temperatures in this deeper water (>11 m) were relatively constant over the period of the study (10-15^{o}) and did not undergo the wide fluctuations that were observed in the surface waters (4-22^{o}). These smaller temperature changes may stabilize these subsurface mats since thermal variability will be small. Within the tailings pond the dynamics of bitumen input and fate are a complex mix of several processes including emulsion formation, flotation and sinking. The importance and interaction between these processes will have to be determined if the steady-state conditions of the tailings pond waters are to be known.

MAJOR ANIONS

The major anions include chloride, sulphate and bicarbonate. In the tailings pond waters the concentrations in equivalents L^{-1} of these anions are found generally in a ratio of $Cl^{-} < SO_4^{=} < HCO_3^{-}$ (15:25:60).

Chloride

During each sampling period, chloride values were relatively uniform over depth (Tables 2-8). In Figure 18, the chloride concentrations, averaged into 1 m depth intervals, are plotted. During 1980, only a slight depth dependence is noted. The mean chloride values in the upper 10 m (76.2 ± 3.3 mg L^{-1}) are about 5% higher than in the deeper zone of 11-16 m (72.3 ± 2.2 mg L^{-1}). Chloride is a conservative component with little chemical, biological or physical changes. Thus, interactions with suspended solids will be small and little seasonal trends should be noted. However, a trend of steadily increasing concentrations with time during the study is noted (Fig. 19). Mean

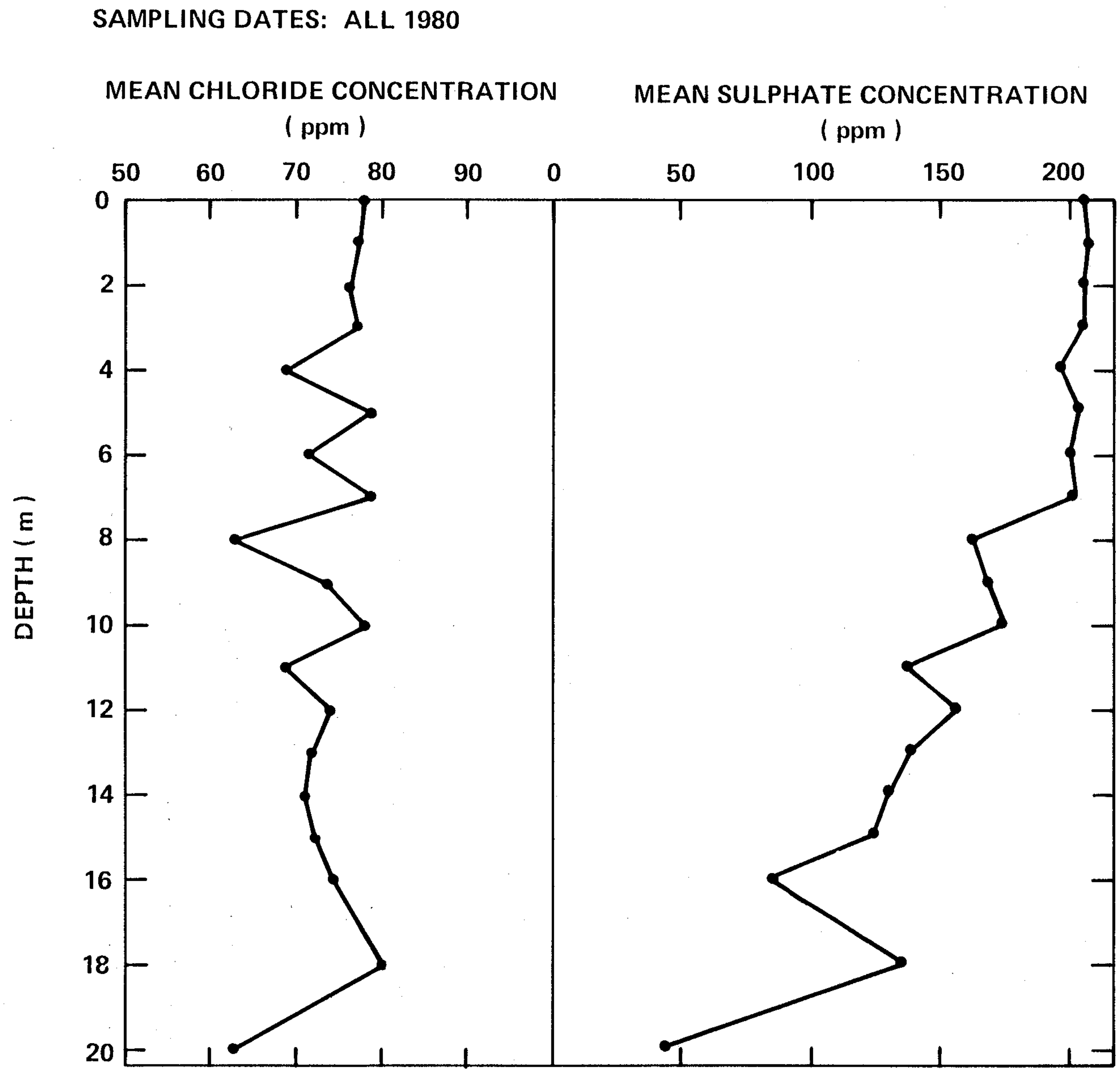

Figure 18. Profiles of mean chloride and sulphate concentrations for all dates.

chloride concentrations in the upper 15 m were about 15-17 mg L^{-1} or about 20% higher in October and November (84-86 mg L^{-1}) than in April and May (68-72 mg L^{-1}). Using the chloride input data from the monthly chloride balance (Water Management Report, December 1980) and assuming the volume of the 0-15 m layer of the tailings pond at about 120 x $10^6 m^3$, the resulting chloride concentration changes to be expected over the study period were calculated (Table 12). The calculated change between May and November of about 14 mg L^{-1} is very close to the observed change of 16-17 mg L^{-1}. Therefore, most of the added chloride to the pond can be accounted for by the increased measured concentrations in the pond waters.

In August, a significant decrease in chloride values was observed (about 5 mg L^{-1}). This decrease is difficult to explain and may indicate an analytical offset. The higher variability and lower chloride values found in the deepest samples (>15 m) may indicate some interference with chloride ion mobility in the high solids content "sludge". These low Cl^- values in the "sludge" zone could also result from the presence of remnants of previous pond waters with low Cl^- values from earlier periods in the pond development. Such waters have yet to be thoroughly mixed with the overlying higher Cl^- containing waters because of the density gradients set up within the pond.

Sulphate

Sulphate concentrations show a trend of decreasing values with depth. In the surface (0-7 m) zone, higher values (190 ± 10 mg L^{-1}) are found than in deeper waters greater than 11 m (110 ± 40 mg L^{-1}). This correlation with depth can be seen in Figure 18 where the sulphate results of all samples averaged into 1 m intervals are plotted. Similar depth profiles are found for each of the sampling days (Tables 2-7). The mean sulphate values in the depth zones 0-5, 6-9, 10-15, and >15 m were plotted versus time and no significant trend with seasonal changes was evident (Fig. 20). This indicates that the pond is operating under steady state conditions with respect to sulphate. Thus the rates of input and removal must balance and no net buildup in sulphate concentrations in the pond have yet to be seen.

In the deepest samples (>15 m) where there is a high suspended load (10-35%), the sulphate values were very low (3-30 ppm). This may have been the result of precipitate or ion pair formation. Such interactions would limit sulphate mobility and reduce the measured free sulphate concentrations. Also, sulphate concentrations could be reduced by microbial utilization or reduction (Hem, 1970). This should lead to an increase in sulphide or mercaptan concentrations.

Inorganic Carbon: Bicarbonate

The mean pH of the tailings pond waters is about 8.2. At this pH, inorganic carbon is primarily (>99%) the bicarbonate (HCO_3^-) species (Hem, 1970). Inorganic carbon concentrations, expressed as HCO_3^-, are about 10-15% higher (470-600 mg L^{-1}) in deeper water (>10 m) than those

Table 12. Mean Chloride Changes in the upper 15 m of the Tailings Pond during 1980.

Date	Average Chloride Concentration (ppm)	Input of Chloride per month* (10^5Kg)	Calculated Change in Chloride concentrations by Input** (ppm)
April 30	68.8 ± 2.4		
May 8	72.1 ± 2.9	3.7	3.1
June 17	79.7 ± 3.3	0.9	0.8
July 23	77.6 ± 2.9	1.4	1.2
August 25	73.0 ± 4.6	2.9	2.4
September	N.A.	4.5	3.8
October 7	84.0 ± 1.7	2.8	2.3
November 14	86.3 ± 1.5***		

Observed change = 86.3 - 68.8
= 17.5 ppm

Calculated change = 13.6 ppm

*D. Heaton, Chloride Summary from Water Management Report (December 1980)

**Assume volume 0-15 m ≃ 120 x $10^6 m^3$

Calculated Chloride Change because of Chloride Input =
Input (Kg)/120 x $10^6 m^3$= ppm

***
Mean of only 3 observations

N.A.
Not analyzed

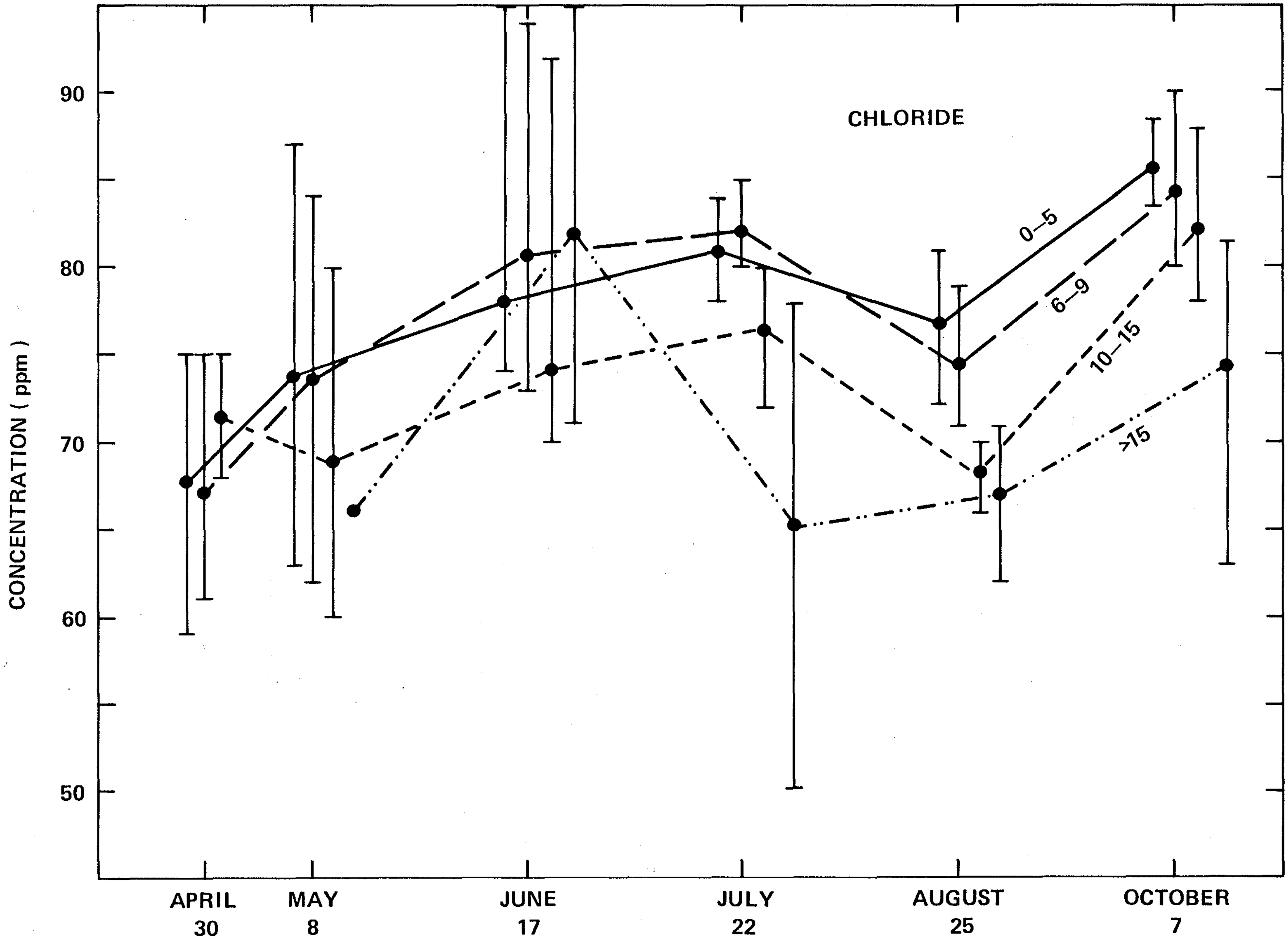

Figure 19. Chloride concentrations averaged into depth zones plotted versus date of sampling.

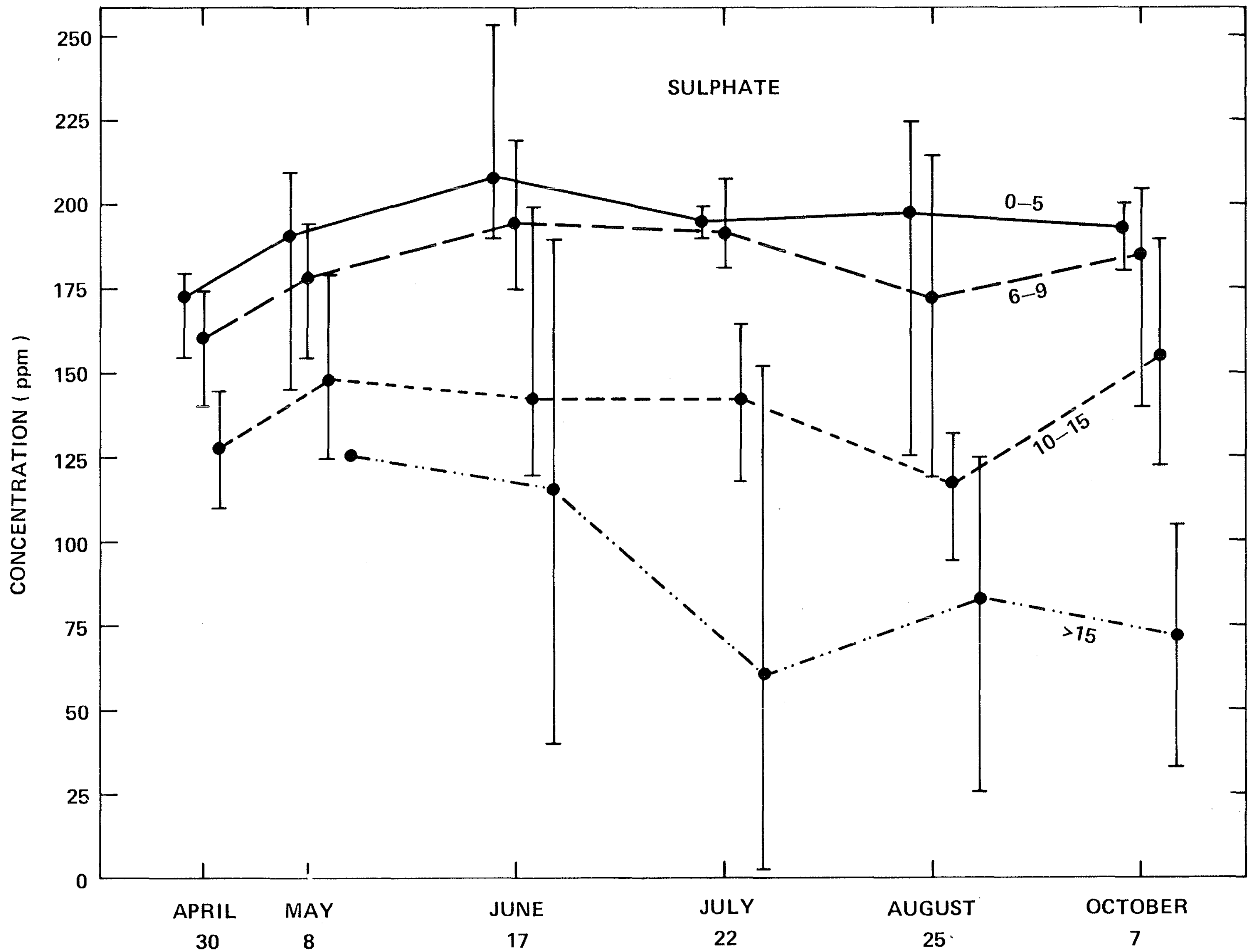

Figure 20. Sulphate concentrations averaged into depth zones plotted versus date of sampling.

(440-500 mg L^{-1}) measured in the surface (0-6 m) zones (Tables 2-7). During the period of this study, a significant increase in HCO_3^- concentrations in the tailings pond was observed. In the upper waters (0-9 m), a steady increase of about 10% in HCO_3^- concentrations from 445 mg L^{-1} in May to 495 mg L^{-1} in October was recorded. In the deeper waters (>10 m), about a 25% increase in mean HCO_3^- values from 479 to about 560 mg L^{-1} during the same period was noted. Most of the bicarbonate added to the pond is derived from the oil sands and their processing. This should have the greatest influence on concentrations in the surface zone. However, a faster rate of HCO_3^- increase was observed in the deeper waters. Because of density differences, mixing between depth zones is poor. Thus the higher rate of increase in deeper waters may indicate a production of inorganic carbon by microbial processes (e.g. respiration by bacteria).

MAJOR CATIONS

The major cations include sodium, potassium, calcium, and magnesium. In tailings pond waters, the relative importance in equivalent weights is generally $Na^+ >> K \simeq Ca \simeq Mg$ (93:3:2:2).

Sodium

Sodium is added to the tailings pond primarily from plant operations (oil sands, extraction chemicals). Within the tailings pond, depth profiles of sodium values show little structure (Tables 2-7), except for slightly lower values in the deeper water (>15 m). During the period of this study, a significant and steady increase in sodium concentrations of about 10% in the upper 15 m zone from April (273 ± 10 mg L^{-1}) to October (300 ± 3 mg L^{-1}) was observed.

Sodium like chloride is a conservative variable and will undergo little interaction. The relationship of Na^+:Cl^- was relatively constant throughout the pond. In the tailings waters, the mean Na^+:Cl^- ratio (concentration expressed in equivalent per liter) was about 5.7 ± 0.1. No significant trend with depth was found. Similarily, no significant variation in this ratio of equivalents was found during the study period. If all the sodium and chloride were explained by NaCl salt, the ratio of Na^+:Cl^- equivalents would be 1.00. The high Na:Cl ratio observed in the pond waters indicates that sources other than just NaCl must be being added to the pond. The high and relatively constant Na^+:Cl^- ratio (5.7) observed may prove to be a useful tracer property for identifying tailings waters.

Potassium

Potassium concentrations (equivalents L^{-1}) are only about 3-5% of the sodium values (Fig. 5). An increase in potassium values with depth from about 14 ± 6 mg L^{-1} in the surface zone (0-6 m) to about 24 ± 10 mg L^{-1} in deeper waters (>10 m) were measured (Tables 2-8).

Calcium

Calcium concentrations (equivalents L^{-1}) are only about 2% of sodium values (Fig. 5). Mean calcium concentrations show a slight negative trend from about 6.0 ± .7 mg L^{-1} in the surface zone (0-6 m) to about 4.7 ± .7 mg L^{-1} in the deeper waters (>10 m) (Tables 2-8).

Magnesium

Magnesium concentrations (equivalents L^{-1}) are about 3% of the sodium concentrations (Fig. 5). Little variation in magnesium concentrations (4.9 ± 1.0 mg L^{-1}) with depth or season was found (Tables 2-8).

ORGANIC CARBON

The dissolved organic content (TOC) of tailings pond waters (40-100 mg C L^{-1}) were high (Tables 2-7) when compared to most surrounding natural waters (<25 mg C L^{-1}). Depth profiles of TOC concentrations show a trend to increasing values with depth. Mean organic carbon values of 45-50 mg C L^{-1} in the surface (0-6 m) zone increased to 55-60 mg C L^{-1} in deeper waters (>10 m) (Table 8). High TOC values in deep samples of high SPM may result from interference of colloidal species which may have been incompletely removed during sample preparation. During this study period, no significant seasonal trends were found.

NUTRIENTS

The nutrients measured in this study were nitrite (NO_2^-), nitrate (NO_3^-), ammonia (NH_3), and phosphate ($PO_4^{\equiv}$). The summary of mean results for each of these nutrients are given in Table 8. Ammonia concentrations (2-8 mg N L^{-1}) were significantly higher than the other nutrients and showed a slight decrease in values with depth. The concentrations of the ohter nutrients were significantly lower, with relative concentrations of $PO_4^{\equiv} > NO_3^- \simeq NO_2^-$.

Phosphate concentrations showed a trend to increasing values with depth. Mean values were lower in the upper 9 m (0.14 ± 1 mg P L^{-1}) than in depths greater than 10 m (.22 ± .2 mg P L^{-1}). Nitrate concentrations showed no significant trend with depth. Mean nitrate concentrations were low (.029 ± .05 mg N L^{-1}). However, a significant decrease was observed in mean concentrations during the study period. In the spring period of April and May, values were higher (0.078 mg N L^{-1}) than during the summer and fall (.003 mg N L^{-1}). Nitrite values were low. A trend to increasing values with depth was noted. Mean concentrations of 0.027 mg N L^{-1} in upper zone (9 m) increased to about 0.052 mg N L^{-1} in deeper waters (>10 m). During the study, mean surface nitrite concentrations showed a decrease with season; from about 0.04 mg N L^{-1} in May and June, to about 0.02 mg N L^{-1} in mid summer and fall.

With the high ammonia and phospahte concentrations measured in the tailings pond, neither nitrogen or phosphorus appear to be limiting nutrients. However, the nitrite and nitrate concentrations are very low. This absence of oxygenated nutrients may be the result of biological reduction or utilization. Oxygen levels in the pond were not measured because of fouling problems of the membrane in O_2 probes. Thus oxygen distributions can only be speculated. Since the surface zone (0-5 m) is well mixed, it should also be well oxygenated. However, in the high density deeper waters, below the pycnocline, mixing with the oxygen-rich surface waters will be slow. The presence of high microbial populations have been reported (Forrester, pers. comm.) but the level of O_2 utilization is not known. The biological effects on oxygen levels should be examined in more detail in the future so that the presence and maintenance of low O_2 or anerobic zones can be confirmed.

TOTAL PHENOLS

Phenol concentrations were determined using a class reaction for free phenols (natural or produced by process). These polar organic compounds are present in relatively high levels (0.15-0.40 mg L^{-1}) in tailings pond waters when compared to concentrations found in surrounding natural waters (<0.005 mg L^{-1}). The phenol concentrations were determined on only one sampling date (22 July). No significant trend of phenol concentrations with depth was noted (Table 8).

TRACE METALS

The concentrations of the minor elements in tailings pond water were generally low (Tables 2-8). The mean results obtained for several elements such as nickel (≃0.030 mg L^{-1}), copper (≃0.05 mg L^{-1}), zinc (≃0.01 mg L^{-1}) and tin (≃0.05 mg L^{-1}) are close to the detection limits of the atomic emission method (ICP). This must limit the confidence in the accuracy of results. Similarily, many lead (0.04 mg L^{-1}) and cadmium (0.03 mg L^{-1}) analyses were close to or below detection limits. These low concentrations that are noted for the above trace elements indicate that no significant buildup in dissolved concentrations of these elements within the tailings pond has been found.

Increasing concentrations of vanadium, molybdenum, iron, manganese, and aluminum were observed with depth. High aluminum concentrations (3-100 mg L^{-1}), particularly in waters of high fines content, probably resulted from colloidal forms of Al instead of elevated levels of the dissolved species. Iron concentration were also high (0.9-3.4 mg L^{-1}). Iron distributions were similar to Al and similarily could be correlated to the incomplete removal of colloidal material rather than highly elevated concentrations of dissolved species. The concentrations of vanadium (0.001-0.18 mg L^{-1}), molybdenum (0.004-0.20 mg L^{-1}), and manganese (0.01-0.23 mg L^{-1}) are low. Their distributions show a correlation with depth; the highest values found in deeper waters of high fines and high bitumen content. For each of these trace metals, similar relative depth profiles on each of the sampling days were noted.

Also, no significant seasonal variations were evident in the results obtained.

Concentrations of titanium (0.30 ± .25 mg L^{-1}), barium (0.08 ± .04 mg L^{-1}) and boron (0.92 ± .2 mg L^{-1}) showed no significant depth dependence (Table 8). The depth profiles of Ti and Ba showed no consistency, with both positive and negative correlations (Tables 2-7 and Appendix II). This may result from analytical problems such as interference or contamination, but could also indicate that these materials have little interaction with other species. Boron concentrations were relatively high. Distributions with depth showed little variability (SD/mean = 10%). Profiles with depth on each sample day were similar and little structure was evident. With the exception of the anomalously low values on 25 August (0.55 ± .17 mg L^{-1}), the mean boron values showed a steady increase during the study period; low values in April and May (0.92 ± .09 mg L^{-1}), increasing in June and July (1.00 ± .02 mg L^{-1}) and highest values in October (1.10 ± .02 mg L^{-1}). Assuming the volume of the tailings pond at about 130 x $10^6 m^3$, this would mean that during our study period about 2.4 x 10^4Kg of boron were added to the pond. Boron is relatively conservative and will undergo little interaction. A material like boron may prove to be a useful tracer component since its mean concentration in tailings waters (≃1.0 mg L^{-1}) is about 10 times higher than that in surrounding waters (<0.1 mg L^{-1}).

OTHER PROPERTIES

Conductivity was relatively constant during this study (Tables 2-8). While some depth dependence was evident, the change in values from surface to deeper waters was usually not greater than 10%. No significant trends in mean conductivity values were found over the period of this study.

Generally, the pH showed an increase with depth (Tables 2-8). No obvious seasonal trends of pH values were seen. The mean pH values show about a 3% increase from lower values (8.09 ± .17) in the surface zone (0-6 m) to higher values (8.29 ± .25) in deeper water (>10 m). A high range of pH values (7.6-8.6) was observed. However, the low pH values (>7.9) may have been the result of instrumental problems with the pH electrodes because of interference from fines and bitumen.

CONCLUSIONS

With the information gathered in 1980, some understanding of the present state of the tailings pond and the dynamics of mixing within the pond can now be obtained. This data and the interpretation of distributions will provide a good base to which future pond conditions can be compared and with which the evolution of chemical and physical changes within the pond can be predicted. The variations in variable distributions with depth and season indicate that the tailings pond is a complex system which is undergoing significant internal interactions and is being influenced by external factors. Development of a tailings pond model at this stage is premature. However, with more data from future studies, a realistic model of the tailings pond should be possible. Such a model should allow the prediction of trends and changes within the pond and the estimation of ultimate concentration levels of specific variables in pond waters at various stages of its development.

In Figure 21, a simplified cross-sectional picture of the tailings pond is shown. Specific well-characterized zones can be identified within the pond. A generalization of their relationships to each other is given in Figure 21. The tailings pond is a well-stratified waterbody with little active mixing between the less dense surface zone and the high density deeper zones. While the well mixed surface zone (0-6 m) of low, but uniform, density reacts quickly to external influences (climatic) and inputs (tailings disposal), the deep zone (>10 m) of high solids and high density show little immediate or

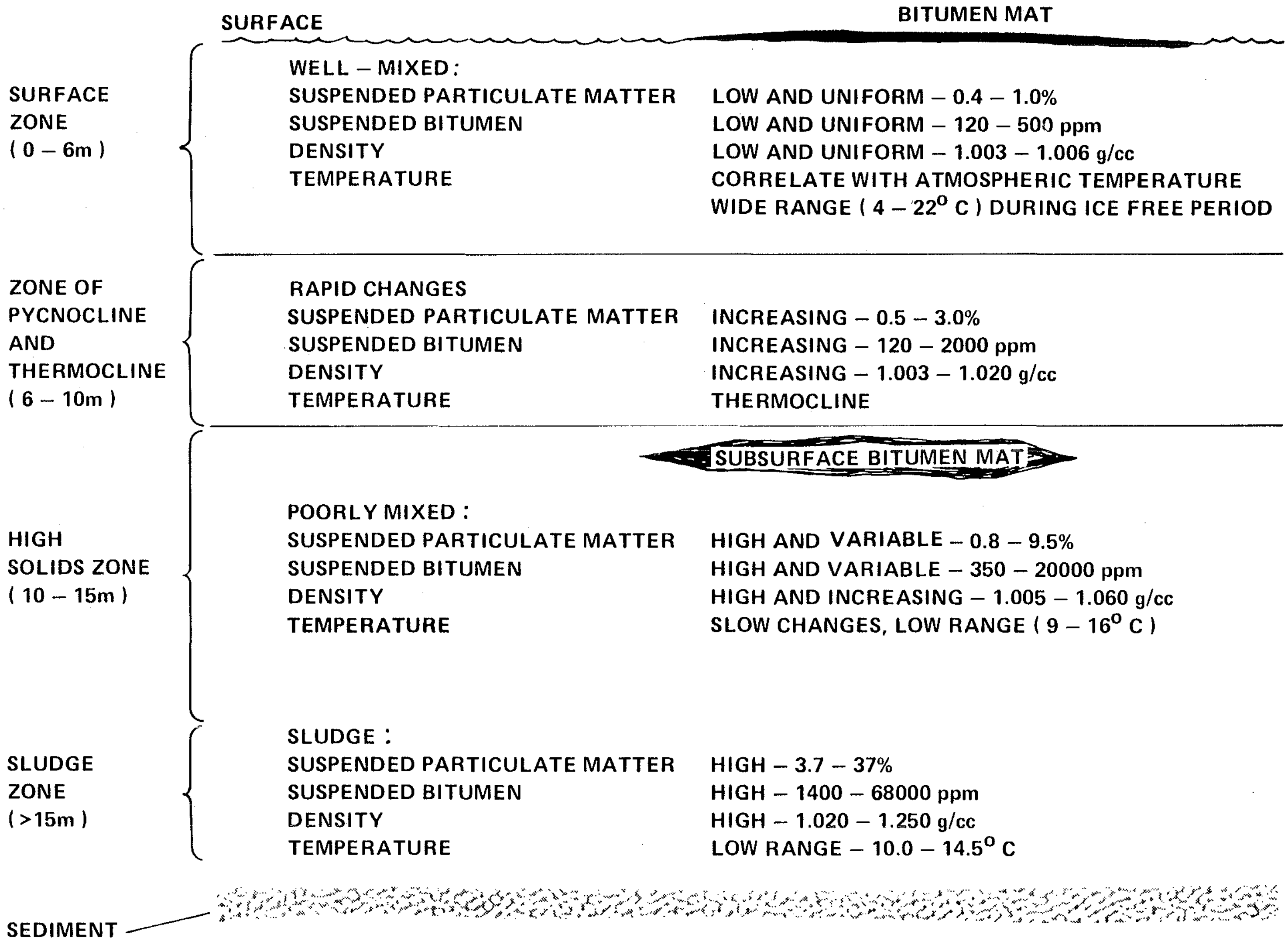

Figure 21. CROSS – SECTION OF TAILINGS POND

short term response to external factors. The mixing between zones is slow. Mixing processes seem to be mainly diffusive rather than advective. Heat transfers from surface to deep zones is low, with the temperatures in the deep water undergoing a smaller range of changes and at different rates than in the surface zones (Fig. 13). Because of the density differences between zones, no evidence of spring or fall overturn phenomena and resulting complete vertical mixing throughout the whole pond was observed.

Concentrations of some of the variables, such as chloride, sodium, and boron which are conservative in nature, showed trends to steadily increasing values throughout the period of the study. These increases could be explained as response to external inputs from process waters. Close agreement between observed and calculated changes in concentrations by such inputs into the tailings pond waters were found. Concentrations of variables such as SPM and bitumen underwent seasonal variations, with highest concentrations in periods of cooler waters. In the surface zone, these changes seem to be the result of a correlation between water temperature and the stability of the bitumen:water: sand emulsion present in the pond. No steady buildup in SPM or bitumen values were measured even though the rate of tailings input into the pond was maintained relatively constant. This seems to indicate that the tailings pond is operating in a steady-state condition with respect to SPM and bitumen in the surface zone. Short term influences of tailings disposal (sand and bitumen) input on the composition of deeper waters is difficult ot assess from the present data. Little effect on the actual sludge concentration and its stability were observed. In the deeper waters (>11 m), the concentrations of SPM and bitumen were high and variable. Also the samples were often quite heterogeneous with obvious phase separation of the bitumen, sand and water fractions. This made accurate subsampling and replication of analyses more difficult. Thus detailed interpretation of trends and interactions within this deep zone is less obvious than in the more homogeneous well mixed surface zone.

As expected, the quality of the tailings pond water, with respect to the concentration of dissolved species such as organic matter, dissolved solids, trace metals, nutrients, major cations and major anions is significantly different from surrounding surface waters. Interactions between the dissolved and particulate species were found to influence distributions and thus affect ultimate concentrations of dissolved solids within the tailings pond waters. However, while concentrations of dissolved components are higher in tailings pond waters, their values do not seem to be high enough, at present, within the pond to be considered a major hazard.

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APPENDIX I

Command File for Data Manipulation Using SPSS Package

```
SPSS BATCH SYSTEM                                                                               12/12/80        PAGE    1

MTS/SPSS, VERSION H, RELEASE 8.1, AUGUST 15, 1980

                                        CURRENT DOCUMENTATION FOR THE SPSS BATCH SYSTEM
ORDER FROM MCGRAW-HILL:  SPSS, 2ND ED. (PRINCIPAL TEXT)        ORDER FROM SPSS INC.:  SPSS STATISTICAL ALGORITHMS
                         SPSS PRIMER (BRIEF INTRO TO SPSS)                            SPSS POCKET GUIDE, RELEASE 8
                         SPSS UPDATE (USE W/SPSS,2ND FOR REL. 7 & 8)                  KEYWORDS: THE SPSS INC. NEWSLETTER


DEFAULT SPACE ALLOCATION..      ALLOWS FOR..   128 TRANSFORMATIONS
WORKSPACE      89600 BYTES                     512 RECODE VALUES + LAG VARIABLES
TRANSPACE      12800 BYTES                    2048 IF/COMPUTE OPERATIONS

                    RUN NAME        1980 TAILINGS POND STUDY
                    DATA LIST       FIXED (3)/1 DATE 2-9
                                    STAT 10-15,DEPTH 16-21,TEMP 22-27,PH 28-33,CHLOR 34-39,
                                    SULPH 40-45,
                                    BICARB 46-51,TOC 52-57,TSOLIDS 58-63,SPMGRAV 64-69,
                                    SPMTURB 70-75,
                                    DSOLIDS 76-80/2 BITUMEN 2-9,CONDUCT 10-15,NA 16-21,
                                    K 22-27,CA 28-33,
                                    MG 34-39, NITRITE 40-45,NITRATE 46-51, PO4 52-57,
                                    V 58-63,TI 64-69,
                                    CO 70-75,MO 76-80/3 FE 2-9,MN 10-15,AL 16-21,CD 22-27,ZN 28-33,
                                    B 34-39, BA 40-45,PB 46-51/

THE DATA LIST PROVIDES FOR  34 VARIABLES AND  3 RECORDS ('CARDS') PER CASE. A MAXIMUM OF   80 COLUMNS ARE USED ON A RECORD.

WARNING - A NUMERIC VARIABLE HAS A WIDTH GREATER THAN 7. SMALL ROUNDING/TRUNCATION ERRORS MAY RESULT.

LIST OF THE CONSTRUCTED FORMAT STATEMENT..
        (1X,F8.0,11F6.0,F5.0/1X,F8.0,11F6.0,F5.0/1X,F8.0,7F6.0)

                    INPUT MEDIUM    DISK
                    SUBFILE LIST    APR30(25),MAY08(101),JUN17(124),JUL22(113),
                                    AUG25(113),OCT07(103)
                    COMMENT         SUBFILE LIST   OCT07(103)
                    MISSING VALUES  ALL (-0.0,-0.)
                    VAR LABELS      STAT,STATION NUMBER/
                                    TEMP,TEMPERATURE <C>/
                                    CHLOR,CHLORIDE CONCENTRATION <PPM>/
                                    SULPH,SULPHATE CONCENTRATION <PPM>/
                                    BICARB,BICARBONATE CONCENTRATION <PPM>/
                                    TOC,TOTAL ORGANIC CARBON <PPM>/
                                    TSOLIDS,TOTAL SOLIDS <%>/
                                    SPMGRAV,SPM-GRAVIMETRIC <%>/
                                    SPMTURB,SPM-TURBIDITY <%>/
                                    DSOLIDS,DISSOLVED SOLIDS <%>/
                                    BITUMEN,TOTAL BITUMEN <PPM>/
                                    CONDUCT,CONDUCTIVITY <S>/
                                    NA,SODIUM CONCENTRATION <PPM>/K,POTASSIUM <PPM>/
                                    CA,CALCIUM <PPM>/MG,MAGNESIUM <PPM>/
                                    NITRITE,NITRITE CONCENTRATION <PPM>/
                                    NITRATE,NITRATE CONCENTRATION <PPM>/
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```
                     PO4,PHOSPHATE CONCENTRATION <PPM>/
                     V,VANADIUM<PPM>/TI,TITANIUM <PPM>/CO,COBALT <PPM>/
                     MO,MOLYBDENUM <PPM>/FE,IRON  <PPM>/
                     MN,MANGANESE <PPM>/AL,ALUMINUM <PPM>/
                     CD,CADMIUM <PPM>/ZN,ZINC <PPM>/B,BORON <PPM>/
                     BA,BARIUM <PPM>/PB,LEAD <PPM>/
RUN SUBFILES         EACH
READ INPUT DATA
```

APPENDIX II

Raw Data from Analyses

of Tailings Pond Waters during 1980

DATE	STAT	DEPTH	TEMP	PH	CHLOR	SULPH	BICARB	TOC	CONDUCT	NITRITE	NITRATE	PO4
300480.	1.	0.0	15.25	8.60	0.0	0.0	0.0	0.0	1100.	0.0	0.0	0.0
300480.	1.	1.0	15.10	8.46	63.00	170.00	376.00	50.00	1100.	0.045	0.075	0.200
300480.	1.	2.0	14.80	8.43	67.00	175.00	320.00	42.50	1130.	0.045	0.075	0.180
300480.	1.	3.0	14.55	8.44	66.00	170.00	376.00	50.00	1130.	0.045	0.075	0.180
300480.	1.	4.0	15.20	8.40	73.00	170.00	351.00	47.50	1140.	0.055	0.095	0.250
300480.	1.	5.0	13.25	8.40	73.00	175.00	351.00	74.50	1140.	0.060	0.100	0.320
300480.	1.	6.0	11.45	8.41	69.00	175.00	351.00	52.50	1130.	0.070	0.130	0.340
300480.	1.	7.0	10.60	8.40	0.0	0.0	0.0	0.0	1120.	0.0	0.0	0.0
300480.	1.	8.0	9.65	8.39	65.00	160.00	422.00	60.00	1100.	0.060	0.140	0.320
300480.	1.	9.0	9.15	8.26	67.00	165.00	397.00	55.00	970.	0.055	0.055	0.260
300480.	2.	0.0	0.0	0.0	64.00	175.00	386.00	52.50	0.	0.030	0.030	0.150
300480.	2.	1.0	0.0	0.0	66.00	180.00	381.00	50.00	0.	0.045	0.045	0.240
300480.	2.	2.0	0.0	0.0	65.00	175.00	381.00	50.00	0.	0.040	0.040	0.190
300480.	2.	3.0	0.0	0.0	59.00	165.00	336.00	45.00	0.	0.035	0.045	0.150
300480.	2.	4.0	0.0	0.0	65.00	155.00	407.00	60.00	0.	0.035	0.045	0.180
300480.	2.	6.0	0.0	0.0	65.00	155.00	351.00	55.00	0.	0.050	0.070	0.280
300480.	2.	8.0	0.0	0.0	61.00	145.00	0.0	47.50	0.	0.045	0.075	0.200
300480.	3.	0.0	0.0	0.0	74.00	180.00	361.00	45.00	0.	0.055	0.075	0.420
300480.	3.	1.0	0.0	0.0	69.00	175.00	336.00	40.00	0.	0.060	0.090	0.430
300480.	3.	3.0	0.0	0.0	72.00	180.00	320.00	62.50	0.	0.060	0.080	0.470
300480.	3.	5.0	0.0	0.0	75.00	175.00	305.00	53.00	0.	0.080	0.080	0.680
300480.	3.	7.0	0.0	0.0	75.00	160.00	0.0	0.0	0.	0.058	0.092	0.520
300480.	3.	10.0	0.0	0.0	75.00	145.00	0.0	0.0	0.	0.045	0.115	1.000
300480.	3.	14.0	0.0	0.0	68.00	110.00	0.0	0.0	0.	0.050	0.020	0.138
300480.	3.	15.0	0.0	0.0	69.00	120.00	0.0	0.0	0.	0.055	0.035	0.136

DATE	STAT	DEPTH	BITUMEN	TSOLIDS	SPMGRAV	NA	K	CA	MG	FE	MN	AL
300480.	1.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
300480.	1.	1.0	226.5	0.0	0.46	225.00	6.90	5.80	4.30	5.2040	0.0501	23.6700
300480.	1.	2.0	237.8	0.0	0.48	265.00	7.50	5.80	4.30	5.1150	0.0517	23.1100
300480.	1.	3.0	218.8	0.0	0.49	250.00	6.50	5.40	4.20	4.9100	0.0493	22.0600
300480.	1.	4.0	301.9	0.0	0.62	272.00	8.70	4.80	4.40	6.4700	0.0505	29.7600
300480.	1.	5.0	354.9	0.0	0.73	271.00	10.20	4.80	4.80	8.7360	0.0596	40.1500
300480.	1.	6.0	855.6	0.0	1.02	250.00	11.50	5.00	5.80	11.5000	0.0739	51.6200
300480.	1.	7.0	922.0	0.0	1.38	0.0	0.0	0.0	0.0	0.0	0.0	0.0
300480.	1.	8.0	1124.0	0.0	1.83	274.00	11.50	5.20	5.80	11.7100	0.0856	48.9300
300480.	1.	9.0	1026.2	0.0	2.17	289.00	11.50	5.10	5.30	10.6000	0.0801	41.8500
300480.	2.	0.0	297.5	0.0	0.46	272.00	7.20	5.50	3.80	3.6760	0.0433	15.8300
300480.	2.	1.0	247.5	0.0	0.45	266.00	9.80	5.80	4.60	6.4950	0.0608	29.4800
300480.	2.	2.0	165.7	0.0	0.44	260.00	8.20	5.70	4.20	4.9930	0.0518	22.5600
300480.	2.	3.0	266.1	0.0	0.44	237.00	6.90	5.20	3.80	4.0740	0.0459	18.5300
300480.	2.	4.0	285.1	0.0	0.45	255.00	9.10	5.30	3.90	4.6470	0.0642	21.0800
300480.	2.	6.0	686.0	0.0	0.89	257.00	9.70	4.40	4.70	9.4430	0.0663	40.8900
300480.	2.	8.0	1373.9	0.0	1.55	255.00	9.20	5.30	5.20	8.6470	0.0701	32.7500
300480.	3.	0.0	278.0	0.0	0.45	288.00	9.70	6.40	5.30	9.2810	0.0735	41.1800
300480.	3.	1.0	254.0	0.0	0.41	264.00	8.90	6.50	5.30	9.2120	0.0722	40.7200
300480.	3.	3.0	238.3	0.0	0.43	281.00	11.20	6.70	5.60	10.5700	0.0843	47.6800
300480.	3.	5.0	403.3	0.0	0.71	285.00	14.50	5.70	6.70	17.5700	0.1138	78.3400
300480.	3.	7.0	966.2	0.0	1.29	300.00	13.50	5.40	5.80	14.8800	0.1033	61.0000
300480.	3.	10.0	1640.3	0.0	1.95	301.00	16.70	5.90	7.40	21.8500	0.1445	90.9000
300480.	3.	14.0	6648.0	0.0	8.86	266.00	12.00	3.60	5.20	16.5200	0.1680	53.1300
300480.	3.	15.0	5860.0	0.0	7.79	276.00	13.10	3.80	5.40	12.9500	0.1101	42.1200

DATE	STAT	DEPTH	V	TI	CO	MO	CD	ZN	B	BA	PB
300480.	1.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
300480.	1.	1.0	0.0421	0.6136	0.0044	0.1225	0.0363	0.0125	0.9647	0.0856	0.0712
300480.	1.	2.0	0.0497	0.5926	0.0114	0.1121	0.0662	0.0129	0.9234	0.0853	0.0969
300480.	1.	3.0	0.0484	0.5458	0.0150	0.1100	0.0761	0.0156	0.8834	0.0809	0.1169
300480.	1.	4.0	0.0461	0.6365	0.0093	0.1419	0.0	0.0052	1.0420	0.0849	0.0
300480.	1.	5.0	0.0598	0.7957	0.0196	0.0676	0.0	0.0101	0.9776	0.0971	0.0
300480.	1.	6.0	0.0748	0.9073	0.0206	0.0755	0.0	0.0148	0.9445	0.1159	0.0
300480.	1.	7.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
300480.	1.	8.0	0.0948	0.6811	0.0148	0.2139	0.0916	0.0290	1.0910	0.1211	0.1145
300480.	1.	9.0	0.0913	0.5183	0.0145	0.1583	0.0998	0.0279	1.1030	0.1093	0.1401
300480.	2.	0.0	0.0481	0.4338	0.0184	0.1244	0.1061	0.0128	0.0	0.0733	0.1530
300480.	2.	1.0	0.0689	0.8587	0.0213	0.1508	0.1159	0.0170	0.9261	0.1106	0.1726
300480.	2.	2.0	0.0583	0.6647	0.0223	0.1376	0.1249	0.0141	0.9010	0.0874	0.1692
300480.	2.	3.0	0.0562	0.5468	0.0276	0.1326	0.1349	0.0136	0.8204	0.0756	0.1878
300480.	2.	4.0	0.0609	0.5910	0.0461	0.1297	0.1592	0.0287	0.8289	0.0762	0.2262
300480.	2.	6.0	0.0959	0.8297	0.0311	0.1654	0.1473	0.0259	0.9972	0.1046	0.1906
300480.	2.	8.0	0.0866	0.4067	0.0321	0.1664	0.1498	0.0350	0.9994	0.0960	0.2128
300480.	3.	0.0	0.0658	1.0920	0.0	0.0982	0.0	0.0132	0.9027	0.1525	0.0
300480.	3.	1.0	0.0631	1.0440	0.0	0.0994	0.0	0.0137	0.8840	0.1230	0.0
300480.	3.	3.0	0.0739	1.2090	0.0	0.1038	0.0	0.0189	0.8876	0.1332	0.0
300480.	3.	5.0	0.1210	1.5970	0.0051	0.1967	0.0119	0.0329	1.1390	0.1716	0.0
300480.	3.	7.0	0.1012	0.9956	0.0045	0.1237	0.0076	0.0277	1.0680	0.1446	0.0
300480.	3.	10.0	0.1408	1.2510	0.0067	0.1735	0.0167	0.0434	1.1060	0.2005	0.0
300480.	3.	14.0	0.0899	0.3262	0.0585	0.1212	0.0424	0.0781	0.9221	0.1037	0.0427
300480.	3.	15.0	0.0718	0.3298	0.0104	0.1142	0.0057	0.0485	0.9523	0.1076	0.0

DATE	STAT	DEPTH	TEMP	PH	CHLOR	SULPH	BICARB	TOC	CONDUCT	NITRITE	NITRATE	PO4
80580.	1.	0.0	16.50	8.32	78.00	205.00	427.00	62.50	0.	0.083	0.052	0.380
80580.	1.	1.0	15.90	8.41	80.00	205.00	427.00	62.50	0.	0.086	0.039	0.380
80580.	1.	2.0	15.30	8.43	82.00	200.00	442.00	65.00	1050.	0.100	0.015	0.520
80580.	1.	3.0	15.40	8.42	82.00	200.00	442.00	65.00	1250.	0.088	0.027	0.390
80580.	1.	4.0	15.50	8.43	0.0	0.0	0.0	0.0	1340.	0.0	0.0	0.0
80580.	1.	5.0	16.00	8.45	83.00	195.00	452.00	69.50	1430.	0.088	0.027	0.510
80580.	1.	6.0	14.60	8.49	0.0	0.0	0.0	0.0	1230.	0.0	0.0	0.0
80580.	1.	7.0	12.70	8.53	78.00	195.00	478.00	80.00	1210.	0.090	0.075	0.700
80580.	1.	8.0	10.90	8.55	0.0	0.0	0.0	0.0	1070.	0.0	0.0	0.0
80580.	1.	9.0	9.80	8.55	73.00	185.00	0.0	102.50	1030.	0.092	0.043	0.900
80580.	1.	10.0	9.70	8.55	0.0	0.0	0.0	0.0	1030.	0.0	0.0	0.0
80580.	1.	11.0	0.0	0.0	60.00	160.00	463.00	45.00	0.	0.044	0.091	0.075
80580.	1.	12.0	0.0	0.0	66.00	150.00	473.00	45.00	0.	0.076	0.074	0.170
80580.	2.	0.0	15.20	8.22	64.00	205.00	452.00	67.50	950.	0.085	0.040	0.440
80580.	2.	1.0	15.20	8.16	75.00	205.00	463.00	62.50	990.	0.075	0.050	0.330
80580.	2.	2.0	15.20	8.14	77.00	200.00	432.00	61.00	1050.	0.083	0.032	0.410
80580.	2.	3.0	15.10	8.12	82.00	200.00	437.00	65.00	1080.	0.081	0.034	0.420
80580.	2.	4.0	15.50	8.15	0.0	0.0	0.0	0.0	1090.	0.0	0.0	0.0
80580.	2.	5.0	16.30	8.15	87.00	180.00	478.00	67.50	1090.	0.085	0.030	0.460
80580.	2.	6.0	14.80	8.22	0.0	0.0	0.0	0.0	1080.	0.0	0.0	0.0
80580.	2.	7.0	12.20	8.32	84.00	185.00	463.00	67.50	1060.	0.093	0.022	0.460
80580.	2.	8.0	11.30	8.38	0.0	0.0	0.0	0.0	1040.	0.0	0.0	0.0
80580.	2.	9.0	9.60	8.42	0.0	0.0	0.0	0.0	1030.	0.0	0.0	0.0
80580.	2.	10.0	9.40	8.43	80.00	180.00	478.00	45.00	1030.	0.033	0.132	0.065
80580.	2.	11.0	9.30	8.43	0.0	0.0	0.0	0.0	1020.	0.0	0.0	0.0
80580.	2.	12.0	9.30	8.41	0.0	0.0	0.0	0.0	1020.	0.0	0.0	0.0
80580.	2.	13.0	9.10	8.42	70.00	145.00	458.00	45.00	1020.	0.033	0.092	0.075
80580.	2.	14.0	9.20	8.36	0.0	0.0	0.0	0.0	960.	0.0	0.0	0.0
80580.	3.	0.0	15.10	8.29	80.00	210.00	458.00	60.00	850.	0.069	0.046	0.350
80580.	3.	1.0	14.90	8.23	79.00	205.00	468.00	62.50	890.	0.060	0.055	0.320
80580.	3.	2.0	14.90	8.21	79.00	200.00	498.00	62.50	920.	0.071	0.054	0.370
80580.	3.	3.0	14.70	8.23	74.00	195.00	463.00	50.00	1010.	0.033	0.057	0.200
80580.	3.	4.0	14.70	8.23	0.0	0.0	0.0	0.0	1050.	0.0	0.0	0.0
80580.	3.	5.0	16.40	8.24	73.00	185.00	473.00	52.50	1070.	0.043	0.057	0.270
80580.	3.	6.0	15.30	8.17	0.0	0.0	0.0	0.0	1080.	0.0	0.0	0.0
80580.	3.	7.0	12.30	8.24	62.00	160.00	468.00	60.00	1060.	0.073	0.027	0.520
80580.	3.	8.0	9.90	8.30	0.0	0.0	0.0	0.0	1040.	0.0	0.0	0.0
80580.	3.	9.0	9.50	8.31	0.0	0.0	0.0	0.0	1030.	0.0	0.0	0.0
80580.	3.	10.0	9.60	8.32	73.00	175.00	493.00	57.50	1030.	0.059	0.041	0.350
80580.	3.	11.0	9.50	8.33	0.0	0.0	0.0	0.0	1020.	0.0	0.0	0.0
80580.	3.	12.0	9.60	8.32	0.0	0.0	0.0	0.0	1020.	0.0	0.0	0.0
80580.	3.	13.0	9.70	8.31	62.00	130.00	407.00	70.00	1020.	0.072	0.063	0.550
80580.	3.	14.0	0.0	0.0	0.0	0.0	0.0	0.0	0.	0.0	0.0	0.0
80580.	3.	15.0	0.0	0.0	66.00	125.00	473.00	82.50	0.	0.072	0.043	0.520
80580.	4.	0.0	15.20	8.43	71.00	145.00	457.50	50.00	1100.	0.045	0.090	0.240
80580.	4.	1.0	15.10	8.41	70.00	200.00	462.60	52.50	1100.	0.041	0.074	0.250
80580.	4.	2.0	15.00	8.38	63.00	210.00	457.50	47.50	1100.	0.035	0.090	0.220
80580.	4.	3.0	14.90	8.36	69.00	195.00	462.60	47.50	1100.	0.037	0.088	0.230
80580.	4.	4.0	14.90	8.36	0.0	0.0	0.0	0.0	1100.	0.0	0.0	0.0
80580.	4.	5.0	14.80	8.34	71.00	185.00	462.60	50.00	1100.	0.043	0.092	0.250
80580.	4.	6.0	16.20	8.37	0.0	0.0	0.0	0.0	1110.	0.0	0.0	0.0
80580.	4.	6.5	17.20	8.27	0.0	0.0	0.0	0.0	1110.	0.0	0.0	0.0
80580.	4.	7.0	15.50	8.25	70.00	185.00	472.80	50.00	1110.	0.039	0.086	0.230
80580.	4.	8.0	11.50	8.32	0.0	0.0	0.0	0.0	1070.	0.0	0.0	0.0
80580.	4.	9.0	11.30	8.34	0.0	0.0	0.0	0.0	1070.	0.0	0.0	0.0
80580.	4.	10.0	11.20	8.36	66.00	150.00	462.60	60.00	1060.	0.073	0.152	0.520
80580.	4.	11.0	11.10	8.37	0.0	0.0	0.0	0.0	1060.	0.0	0.0	0.0
80580.	4.	12.0	11.20	8.37	0.0	0.0	0.0	0.0	1060.	0.0	0.0	0.0

80580.	4.	13.0	11.20	8.37	64.00	150.00	472.80	50.00	1060.	0.038	0.087	0.200
80580.	5.	0.0	15.30	8.30	71.00	190.00	432.10	52.50	850.	0.049	0.126	0.270
80580.	5.	1.0	15.10	8.31	70.00	190.00	432.10	50.00	910.	0.041	0.084	0.230
80580.	5.	2.0	15.00	8.30	72.00	190.00	437.20	50.00	930.	0.040	0.125	0.180
80580.	5.	3.0	14.90	8.29	72.00	185.00	432.10	52.50	960.	0.028	0.072	0.160
80580.	5.	4.0	14.90	8.28	0.0	0.0	0.0	0.0	1010.	0.0	0.0	0.0
80580.	5.	5.0	14.90	8.27	76.00	180.00	432.10	50.00	1040.	0.030	0.085	0.160
80580.	5.	6.0	16.60	8.32	0.0	0.0	0.0	0.0	1070.	0.0	0.0	0.0
80580.	5.	7.0	16.30	8.31	73.00	155.00	452.40	50.00	1070.	0.040	0.085	0.260
80580.	5.	8.0	14.80	8.23	0.0	0.0	0.0	0.0	1070.	0.0	0.0	0.0
80580.	5.	9.0	14.20	8.23	0.0	0.0	0.0	0.0	1050.	0.0	0.0	0.0
80580.	5.	10.0	13.30	8.27	71.00	145.00	477.80	55.00	1060.	0.050	0.065	0.300
80580.	5.	11.0	12.50	8.29	0.0	0.0	0.0	0.0	1060.	0.0	0.0	0.0
80580.	5.	12.0	12.50	8.30	0.0	0.0	0.0	0.0	1060.	0.0	0.0	0.0
80580.	5.	13.0	12.90	8.29	73.00	130.00	482.90	60.00	1060.	0.052	0.063	0.300
80580.	5.	14.0	12.70	8.28	72.00	125.00	488.00	87.50	1050.	0.050	0.065	0.280
80580.	6.	0.0	15.60	8.18	75.00	185.00	432.10	52.50	980.	0.033	0.072	0.180
80580.	6.	1.0	15.30	8.18	73.00	185.00	421.90	52.50	1040.	0.030	0.060	0.180
80580.	6.	2.0	15.30	8.17	67.00	185.00	427.00	52.50	1070.	0.030	0.065	0.190
80580.	6.	3.0	15.00	8.16	67.00	185.00	427.00	55.00	1060.	0.025	0.058	0.170
80580.	6.	4.0	14.90	8.16	68.00	185.00	427.00	52.50	1080.	0.023	0.047	0.170
80580.	6.	5.0	14.90	8.16	73.00	185.00	432.10	57.50	1090.	0.031	0.039	0.210
80580.	6.	6.0	0.0	0.0	72.00	180.00	427.00	55.00	0.	0.034	0.071	0.200
80580.	7.	0.0	15.50	8.24	73.00	180.00	355.80	50.00	1070.	0.028	0.122	0.160
80580.	7.	1.0	14.90	8.26	68.00	185.00	427.00	52.50	1110.	0.022	0.103	0.140
80580.	7.	2.0	14.70	8.22	72.00	185.00	437.20	50.00	1100.	0.023	0.142	0.140
80580.	7.	3.0	14.40	8.23	75.00	175.00	437.20	50.00	1110.	0.021	0.094	0.140
80580.	8.	0.0	16.40	8.17	70.00	190.00	437.20	50.00	1110.	0.019	0.081	0.140
80580.	8.	1.0	15.50	8.15	69.00	190.00	437.20	50.00	1110.	0.020	0.105	0.140
80580.	8.	2.0	14.80	8.16	72.00	185.00	432.10	50.00	1110.	0.022	0.128	0.160
80580.	8.	3.0	14.80	8.15	74.00	180.00	427.00	47.50	1110.	0.020	0.165	0.160
80580.	8.	4.0	14.80	8.14	0.0	0.0	0.0	0.0	1110.	0.0	0.0	0.0
80580.	8.	5.0	15.60	8.17	75.00	180.00	432.10	50.00	1110.	0.021	0.144	0.180
80580.	8.	6.0	16.00	8.03	77.00	185.00	437.20	52.50	1120.	0.024	0.106	0.190
80580.	9.	0.0	16.10	8.20	78.00	185.00	416.80	50.00	1100.	0.022	0.083	0.150
80580.	9.	1.0	15.60	8.10	82.00	205.00	411.80	50.00	1110.	0.023	0.082	0.160
80580.	9.	2.0	15.20	8.20	84.00	205.00	411.80	47.50	1110.	0.025	0.105	0.160
80580.	9.	3.0	14.80	8.20	71.00	195.00	432.10	50.00	1110.	0.025	0.140	0.180
80580.	10.	0.0	16.60	8.10	72.00	185.00	437.20	55.00	790.	0.029	0.066	0.170
80580.	10.	1.0	15.80	8.10	73.00	185.00	442.30	52.50	870.	0.023	0.102	0.150
80580.	10.	2.0	14.90	8.10	69.00	180.00	406.70	57.50	900.	0.028	0.122	0.150
80580.	10.	3.0	14.90	8.10	72.00	180.00	406.70	50.00	920.	0.020	0.180	0.130
80580.	10.	4.0	14.80	8.10	72.00	185.00	411.80	60.00	940.	0.020	0.150	0.130

DATE	STAT	DEPTH	BITUMEN	TSOLIDS	SPMGRAV	NA	K	CA	MG	FE	MN	AL
80580.	1.	0.0	345.7	0.66	0.55	289.00	11.00	7.50	5.40	9.2570	0.0868	39.0300
80580.	1.	1.0	349.8	0.71	0.57	272.00	11.00	6.80	5.40	22.5300	0.1830	94.2100
80580.	1.	2.0	353.4	0.67	0.56	292.00	10.90	6.80	6.10	18.1200	0.1463	78.4000
80580.	1.	3.0	350.7	0.74	0.58	286.00	11.30	6.30	6.10	12.8400	0.1073	55.4800
80580.	1.	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
80580.	1.	5.0	418.5	0.83	0.69	298.00	12.30	5.60	5.00	13.0600	0.1083	55.9700
80580.	1.	6.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
80580.	1.	7.0	1025.4	1.77	1.59	282.00	12.20	5.60	6.00	15.1000	0.1089	59.0700
80580.	1.	8.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
80580.	1.	9.0	1851.4	2.68	2.33	268.00	14.00	6.50	7.90	13.2800	0.0972	52.1000
80580.	1.	10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
80580.	1.	11.0	2299.4	3.25	2.89	240.00	6.30	4.40	3.40	2.9060	0.0297	9.3520
80580.	1.	12.0	2327.7	3.44	2.69	250.00	7.50	4.20	3.70	3.0530	0.0302	9.8140
80580.	2.	0.0	345.8	0.69	0.54	224.00	7.70	7.10	5.80	22.8400	0.1722	98.7300
80580.	2.	1.0	345.4	0.69	0.56	265.00	8.90	7.10	4.90	2.4870	0.0393	10.1400
80580.	2.	2.0	336.9	0.70	0.53	264.00	8.40	6.70	5.30	4.4610	0.0552	18.8200
80580.	2.	3.0	342.6	0.69	0.55	291.00	9.50	6.60	5.00	6.9900	0.0749	29.2100
80580.	2.	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
80580.	2.	5.0	491.5	0.98	0.79	311.00	10.20	4.80	4.60	7.7690	0.0718	32.4200
80580.	2.	6.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
80580.	2.	7.0	507.9	0.98	0.86	299.00	10.20	4.80	4.60	15.0700	0.1190	61.5300
80580.	2.	8.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
80580.	2.	9.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
80580.	2.	10.0	1112.7	1.77	1.60	305.00	7.00	3.80	3.00	1.7000	0.0204	5.5860
80580.	2.	11.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
80580.	2.	12.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
80580.	2.	13.0	2003.0	2.88	2.59	0.0	0.0	0.0	0.0	2.9460	0.0281	9.6170
80580.	2.	14.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
80580.	3.	0.0	337.0	0.67	0.57	285.00	8.80	6.40	5.20	6.4260	0.0697	27.1500
80580.	3.	1.0	337.0	0.68	0.55	280.00	8.80	6.30	4.70	4.2140	0.1036	17.5600
80580.	3.	2.0	309.8	0.68	0.57	284.00	9.20	5.90	4.90	5.4920	0.0639	22.9800
80580.	3.	3.0	325.5	0.68	0.57	268.00	6.90	5.40	3.80	2.7700	0.0487	10.1300
80580.	3.	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
80580.	3.	5.0	460.9	0.91	0.75	258.00	6.80	4.20	3.40	3.5630	0.0443	13.1500
80580.	3.	6.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
80580.	3.	7.0	859.5	1.48	1.02	240.00	8.00	4.10	3.80	5.8710	0.0540	21.0700
80580.	3.	8.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
80580.	3.	9.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
80580.	3.	10.0	1784.8	2.92	2.76	287.00	8.70	3.70	3.60	5.3040	0.0550	19.3900
80580.	3.	11.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
80580.	3.	12.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
80580.	3.	13.0	2306.9	3.75	3.40	256.00	8.50	4.70	4.00	5.5890	0.0778	19.9600
80580.	3.	14.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
80580.	3.	15.0	2177.8	3.78	3.70	277.00	8.50	4.60	3.80	5.3200	0.0452	18.4100
80580.	4.	0.0	352.1	0.69	0.0	274.00	7.30	5.90	4.00	2.5160	0.0455	9.0400
80580.	4.	1.0	340.0	0.69	0.0	260.00	6.60	5.90	3.90	2.6130	0.0455	9.4040
80580.	4.	2.0	321.3	0.69	0.0	246.00	6.50	5.80	3.70	2.3080	0.0462	8.1300
80580.	4.	3.0	317.0	0.69	0.0	257.00	7.10	5.70	3.90	2.8760	0.0502	10.7600
80580.	4.	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
80580.	4.	5.0	319.5	0.85	0.72	281.00	7.10	4.90	3.60	2.9910	0.0420	10.5700
80580.	4.	6.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
80580.	4.	6.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
80580.	4.	7.0	453.5	0.90	0.77	272.00	6.50	4.70	4.40	3.2830	0.0464	11.5100
80580.	4.	8.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
80580.	4.	9.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
80580.	4.	10.0	853.3	2.93	3.02	259.00	9.20	4.50	4.50	6.5310	0.0593	23.8600
80580.	4.	11.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
80580.	4.	12.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

80580.	4.	13.0	2366.3	3.97	4.00	254.00	6.60	4.40	3.00	2.2620	0.0352	7.7370
80580.	5.	0.0	337.9	0.69	0.49	273.00	6.80	5.70	4.60	2.7060	0.0492	9.5640
80580.	5.	1.0	326.3	0.68	0.55	268.00	6.40	5.70	4.50	2.7030	0.0489	9.6170
80580.	5.	2.0	323.2	0.69	0.60	272.00	7.00	5.60	3.90	2.0000	0.0881	6.6580
80580.	5.	3.0	327.7	0.69	0.55	276.00	6.00	5.60	3.80	1.8450	0.0440	6.0460
80580.	5.	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
80580.	5.	5.0	331.6	0.69	0.57	290.00	6.60	5.80	3.80	1.9310	0.0429	6.4050
80580.	5.	6.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
80580.	5.	7.0	1143.7	1.92	1.68	283.00	7.00	4.70	3.60	3.5320	0.0406	11.8300
80580.	5.	8.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
80580.	5.	9.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
80580.	5.	10.0	1882.8	2.89	2.91	275.00	8.00	4.80	3.80	4.4230	0.0433	15.5300
80580.	5.	11.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
80580.	5.	12.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
80580.	5.	13.0	2224.1	3.53	3.39	286.00	8.20	4.70	3.80	4.5280	0.0429	16.1400
80580.	5.	14.0	2485.0	3.98	3.84	286.00	8.70	4.70	3.80	4.7020	0.0327	16.9800
80580.	6.	0.0	365.7	0.67	0.47	282.00	7.10	6.00	3.90	2.0030	0.0313	6.6990
80580.	6.	1.0	339.6	0.68	0.0	280.00	6.20	6.00	3.70	1.8090	0.0310	5.8950
80580.	6.	2.0	353.5	0.68	0.57	282.00	7.00	6.00	3.70	2.2310	0.0312	7.5850
80580.	6.	3.0	331.7	0.68	0.46	268.00	5.50	5.90	3.60	1.7600	0.0337	5.6220
80580.	6.	4.0	340.7	0.68	0.57	271.00	5.50	5.90	3.60	1.7220	0.0334	5.5040
80580.	6.	5.0	621.8	0.89	0.77	285.00	6.50	6.00	4.00	2.6540	0.0794	8.9100
80580.	6.	6.0	636.1	0.91	0.78	283.00	6.30	6.00	3.80	2.6950	0.0358	9.0090
80580.	7.	0.0	328.0	0.67	0.46	285.00	5.80	6.00	3.80	1.6870	0.0342	5.3820
80580.	7.	1.0	333.7	0.69	0.57	272.00	6.10	6.00	3.70	1.5070	0.0412	4.6340
80580.	7.	2.0	343.4	0.67	0.57	273.00	6.10	5.90	3.60	1.4080	0.0402	4.2180
80580.	7.	3.0	344.7	0.68	0.55	286.00	6.70	6.10	3.70	1.4830	0.0426	4.4800
80580.	8.	0.0	347.9	0.67	0.57	264.00	7.00	6.60	3.90	1.4650	0.0363	4.3790
80580.	8.	1.0	330.5	0.67	0.54	258.00	6.30	6.50	3.70	1.4550	0.0399	4.3840
80580.	8.	2.0	320.0	0.67	0.55	269.00	6.20	6.10	3.60	1.5340	0.0416	4.6160
80580.	8.	3.0	336.9	0.68	0.55	280.00	6.40	5.90	3.60	1.5450	0.0475	4.6500
80580.	8.	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
80580.	8.	5.0	341.9	0.68	0.55	279.00	6.60	5.90	3.50	1.5530	0.0433	4.6530
80580.	8.	6.0	477.4	0.94	0.77	285.00	7.30	4.70	3.20	1.8840	0.3398	6.1600
80580.	9.	0.0	330.6	0.68	0.56	290.00	6.80	5.60	3.50	1.3980	0.0374	4.2020
80580.	9.	1.0	334.8	0.68	0.51	314.00	7.20	5.60	3.70	1.4200	0.0372	4.2930
80580.	9.	2.0	334.2	0.67	0.55	308.00	7.60	5.30	3.50	1.4330	0.0349	4.3500
80580.	9.	3.0	337.4	0.67	0.55	297.00	6.30	5.30	3.40	1.4980	0.0281	4.4500
80580.	10.	0.0	336.5	0.68	0.55	278.00	6.00	6.00	3.60	1.2210	0.0137	3.4360
80580.	10.	1.0	350.5	0.68	0.54	275.00	6.40	6.00	3.70	1.1370	0.0082	3.1170
80580.	10.	2.0	337.6	0.68	0.50	273.00	5.90	5.80	3.60	1.5580	0.0889	4.8160
80580.	10.	3.0	345.5	0.68	0.55	287.00	5.60	5.60	3.40	1.3530	0.0359	3.9590
80580.	10.	4.0	344.5	0.70	0.57	292.00	5.50	5.80	3.40	1.3150	0.0866	3.8150

DATE	STAT	DEPTH	V	TI	CO	MO	CD	ZN	B	BA	PB
80580.	1.	0.0	0.0912	0.9258	0.0079	0.1253	0.0070	0.0159	1.1050	0.1263	0.0100
80580.	1.	1.0	0.1677	2.0830	0.0146	0.1393	0.0014	0.0441	1.2110	0.2699	0.0180
80580.	1.	2.0	0.1203	1.7420	0.0004	0.1043	0.0500	0.0356	1.0900	0.2204	0.0670
80580.	1.	3.0	0.0747	1.2340	0.0	0.0900	0.0990	0.0202	1.1370	0.1809	0.1000
80580.	1.	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
80580.	1.	5.0	0.0936	1.3660	0.0109	0.1016	0.0220	0.0222	1.0310	0.1817	0.0330
80580.	1.	6.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
80580.	1.	7.0	0.1051	0.9058	0.0103	0.0984	0.0180	0.0273	0.9985	0.1730	0.0250
80580.	1.	8.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
80580.	1.	9.0	0.1010	0.6296	0.0203	0.1046	0.0100	0.0235	0.9986	0.1502	0.0008
80580.	1.	10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
80580.	1.	11.0	0.0489	0.0783	0.0139	0.0464	0.0007	0.0025	0.6632	0.0508	0.0292
80580.	1.	12.0	0.0445	0.0769	0.0162	0.0515	0.0112	0.0023	0.6869	0.0564	0.0310
80580.	2.	0.0	0.1686	2.1980	0.0428	0.1749	0.0172	0.0477	0.8877	0.2969	0.0083
80580.	2.	1.0	0.0403	0.2779	0.0211	0.0679	0.0261	0.0027	0.6511	0.0822	0.0650
80580.	2.	2.0	0.0524	0.5172	0.0209	0.0812	0.0299	0.0075	0.6411	0.1116	0.0685
80580.	2.	3.0	0.0627	0.7389	0.0242	0.1542	0.0003	0.0113	0.8431	0.1330	0.0387
80580.	2.	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
80580.	2.	5.0	0.0712	0.7052	0.0225	0.0794	0.0	0.0126	0.8589	0.1279	0.0326
80580.	2.	6.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
80580.	2.	7.0	0.1144	1.2200	0.0407	0.1175	0.0118	0.0272	0.7789	0.1733	0.0252
80580.	2.	8.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
80580.	2.	9.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
80580.	2.	10.0	0.0103	0.0304	0.0	0.0486	0.0150	0.0	1.0450	0.0109	0.0200
80580.	2.	11.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
80580.	2.	12.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
80580.	2.	13.0	0.0231	0.0479	0.0058	0.0482	0.0260	0.0014	0.8339	0.0136	0.0340
80580.	2.	14.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
80580.	3.	0.0	0.0413	0.5818	0.0216	0.0717	0.0300	0.0099	0.9150	0.0959	0.0300
80580.	3.	1.0	0.0279	0.4104	0.0666	0.0604	0.0236	0.0571	0.8825	0.0563	0.0077
80580.	3.	2.0	0.0379	0.5255	0.0195	0.0693	0.0290	0.0078	0.9230	0.0852	0.0410
80580.	3.	3.0	0.0199	0.2340	0.0083	0.0508	0.0240	0.0025	0.7640	0.0332	0.0310
80580.	3.	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
80580.	3.	5.0	0.0080	0.2892	0.0	0.0779	0.0310	0.0	1.0090	0.0252	0.0460
80580.	3.	6.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
80580.	3.	7.0	0.0398	0.2803	0.0234	0.0742	0.0300	0.0093	0.9095	0.0407	0.0320
80580.	3.	8.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
80580.	3.	9.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
80580.	3.	10.0	0.0347	0.3623	0.0204	0.0663	0.0420	0.0380	0.9032	0.0300	0.0410
80580.	3.	11.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
80580.	3.	12.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
80580.	3.	13.0	0.0388	0.2764	0.0538	0.0742	0.0060	0.0380	0.9032	0.0300	0.0160
80580.	3.	14.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
80580.	3.	15.0	0.0362	0.2665	0.0215	0.0712	0.0400	0.0120	0.8071	0.0340	0.0460
80580.	4.	0.0	0.0162	0.2191	0.0090	0.0584	0.0220	0.0028	0.7145	0.0292	0.0320
80580.	4.	1.0	0.0217	0.4070	0.0091	0.0384	0.0130	0.0	0.8578	0.0637	0.0280
80580.	4.	2.0	0.0216	0.4178	0.0109	0.0383	0.0030	0.0	0.8311	0.0620	0.0190
80580.	4.	3.0	0.0251	0.6629	0.0120	0.0430	0.0020	0.0	0.8356	0.0684	0.0220
80580.	4.	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
80580.	4.	5.0	0.3240	0.3674	0.0183	0.0183	0.0110	0.0106	1.0450	0.0612	0.0210
80580.	4.	6.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
80580.	4.	6.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
80580.	4.	7.0	0.0241	0.4020	0.0176	0.0522	0.0130	0.0010	0.9166	0.0646	0.0240
80580.	4.	8.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
80580.	4.	9.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
80580.	4.	10.0	0.0437	0.6388	0.0372	0.0631	0.0190	0.0131	0.9178	0.0807	0.0300
80580.	4.	11.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
80580.	4.	12.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

80580.	4.	13.0	0.0192	0.2623	0.0123	0.1441	0.0150	0.0169	1.0410	0.0552	0.0170
80580.	5.	0.0	0.0217	0.4520	0.0123	0.0470	0.0190	0.0005	0.8623	0.0675	0.0250
80580.	5.	1.0	0.0207	0.4402	0.0137	0.0449	0.0160	0.0006	0.8251	0.0686	0.0160
80580.	5.	2.0	0.0199	0.3014	0.0576	0.0492	0.0340	0.0423	0.8063	0.0565	0.0245
80580.	5.	3.0	0.0179	0.0	0.0122	0.0495	0.0100	0.0	0.7854	0.0616	0.0110
80580.	5.	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
80580.	5.	5.0	0.0204	0.3250	0.0120	0.0448	0.0090	0.0	0.7738	0.0619	0.0110
80580.	5.	6.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
80580.	5.	7.0	0.0297	0.4405	0.0203	0.0609	0.0050	0.0023	0.8931	0.0786	0.0200
80580.	5.	8.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
80580.	5.	9.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
80580.	5.	10.0	0.0329	0.4618	0.0218	0.0575	0.0012	0.0043	0.8724	0.0712	0.0200
80580.	5.	11.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
80580.	5.	12.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
80580.	5.	13.0	0.0341	0.3334	0.0236	0.0531	0.0	0.0047	0.8475	0.0681	0.0
80580.	5.	14.0	0.0504	0.4149	0.0120	0.0597	0.0280	0.0	0.9192	0.0624	0.0470
80580.	6.	0.0	0.0131	0.4015	0.0	0.0409	0.0170	0.0	0.7996	0.0622	0.0230
80580.	6.	1.0	0.0170	0.2449	0.0	0.0532	0.0160	0.0	0.7947	0.0609	0.0210
80580.	6.	2.0	0.0194	0.4562	0.0	0.0546	0.0190	0.0	0.8229	0.0958	0.0270
80580.	6.	3.0	0.0155	0.2741	0.0	0.0588	0.0150	0.0	0.7987	0.0624	0.0200
80580.	6.	4.0	0.0154	0.2902	0.0	0.0566	0.0150	0.0	0.7905	0.0620	0.0190
80580.	6.	5.0	0.0224	0.3204	0.0506	0.0560	0.0276	0.0350	0.8303	0.0598	0.0132
80580.	6.	6.0	0.0177	0.3067	0.0006	0.0440	0.0230	0.0	0.8309	0.0667	0.0320
80580.	7.	0.0	0.0186	0.3537	0.0	0.0390	0.0140	0.0	0.7716	0.0626	0.0190
80580.	7.	1.0	0.0167	0.3229	0.0001	0.0579	0.0130	0.0	0.9652	0.0602	0.0056
80580.	7.	2.0	0.0037	0.3058	0.0	0.0382	0.0120	0.0	0.8958	0.0579	0.0150
80580.	7.	3.0	0.0191	0.3528	0.0017	0.0585	0.0110	0.0006	0.8983	0.0621	0.0126
80580.	8.	0.0	0.0206	0.4001	0.0	0.0513	0.0120	0.0	0.8670	0.0743	0.0090
80580.	8.	1.0	0.0238	0.4033	0.0019	0.0693	0.0050	0.0	0.8592	0.0650	0.0183
80580.	8.	2.0	0.0205	0.4152	0.0041	0.0682	0.0070	0.0001	0.8628	0.0642	0.0196
80580.	8.	3.0	0.0191	0.4220	0.0082	0.0695	0.0110	0.0063	0.8662	0.0623	0.0268
80580.	8.	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
80580.	8.	5.0	0.0201	0.4713	0.0045	0.0649	0.0110	0.0009	0.8606	0.0633	0.0277
80580.	8.	6.0	0.0234	0.3084	0.0068	0.0726	0.0050	0.0051	0.8780	0.0566	0.0345
80580.	9.	0.0	0.0156	0.3260	0.0017	0.0947	0.0120	0.0	0.9817	0.0591	0.0150
80580.	9.	1.0	0.0099	0.3426	0.0	0.0399	0.0120	0.0	0.8860	0.0589	0.0150
80580.	9.	2.0	0.0	0.3313	0.0	0.0166	0.0120	0.0	0.8372	0.0544	0.0150
80580.	9.	3.0	0.0	0.3808	0.0	0.0024	0.0120	0.0	0.8191	0.0780	0.0160
80580.	10.	0.0	0.0	0.3058	0.0	0.0	0.0	0.0	0.6667	0.0276	0.0
80580.	10.	1.0	0.0	0.2896	0.0	0.0	0.0100	0.0	0.6225	0.0174	0.0110
80580.	10.	2.0	0.0133	0.4603	0.0550	0.0	0.0302	0.0424	0.8335	0.0554	0.0390
80580.	10.	3.0	0.0114	0.2826	0.0019	0.0	0.0009	0.0	0.8152	0.0570	0.0140
80580.	10.	4.0	0.0218	0.3390	0.0608	0.0319	0.0649	0.0431	0.8302	0.0545	0.0724

DATE	STAT	DEPTH	TEMP	PH	CHLOR	SULPH	BICARB	TOC	CONDUCT	NITRITE	NITRATE	PO4
170680.	1.	0.0	18.40	8.14	74.00	205.00	432.10	36.50	1180.	0.010	0.004	0.052
170680.	1.	1.0	18.20	8.14	79.00	250.00	432.10	37.50	1180.	0.011	0.0	0.045
170680.	1.	2.0	18.10	8.14	79.00	200.00	437.20	37.00	1180.	0.010	0.0	0.050
170680.	1.	3.0	18.10	8.15	79.00	205.00	434.60	36.00	1170.	0.011	0.008	0.055
170680.	1.	4.0	17.90	0.0	0.0	0.0	0.0	0.0	1170.	0.0	0.0	0.0
170680.	1.	5.0	19.00	8.12	78.00	200.00	434.60	37.50	1200.	0.011	0.003	0.045
170680.	1.	6.0	18.80	0.0	0.0	0.0	0.0	0.0	1200.	0.0	0.0	0.0
170680.	1.	7.0	16.70	8.42	77.00	215.00	444.80	39.00	1150.	0.012	0.0	0.068
170680.	1.	8.0	13.20	0.0	0.0	0.0	0.0	0.0	1100.	0.0	0.0	0.0
170680.	1.	9.0	11.80	0.0	0.0	0.0	0.0	0.0	1080.	0.0	0.0	0.0
170680.	1.	10.0	11.10	8.55	75.00	165.00	470.20	49.50	1070.	0.026	0.0	0.120
170680.	1.	11.0	10.60	0.0	0.0	0.0	0.0	0.0	1060.	0.0	0.0	0.0
170680.	1.	12.0	0.0	8.60	74.00	145.00	480.40	42.50	0.	0.027	0.0	0.140
170680.	1.	14.0	0.0	0.0	74.00	125.00	482.90	44.50	0.	0.024	0.004	0.100
170680.	2.	0.0	18.40	8.13	76.00	205.00	437.20	38.50	1180.	0.014	0.008	0.055
170680.	2.	1.0	18.20	8.15	76.00	205.00	437.20	38.50	1180.	0.014	0.003	0.090
170680.	2.	2.0	18.10	8.15	76.00	215.00	437.20	37.00	1180.	0.015	0.0	0.052
170680.	2.	3.0	18.00	8.12	76.00	200.00	447.30	37.50	1180.	0.012	0.003	0.050
170680.	2.	4.0	17.90	0.0	0.0	0.0	0.0	0.0	1180.	0.0	0.0	0.0
170680.	2.	5.0	17.80	8.42	78.00	190.00	452.40	39.00	1160.	0.019	0.003	0.085
170680.	2.	6.0	16.80	0.0	0.0	0.0	0.0	0.0	1140.	0.0	0.0	0.0
170680.	2.	7.0	15.40	8.51	89.00	175.00	462.60	58.50	1130.	0.025	0.0	0.110
170680.	2.	8.0	12.70	0.0	0.0	0.0	0.0	0.0	1100.	0.0	0.0	0.0
170680.	2.	9.0	11.40	0.0	0.0	0.0	0.0	0.0	1070.	0.0	0.0	0.0
170680.	2.	10.0	11.10	8.60	73.00	165.00	467.70	56.50	1070.	0.029	0.003	0.140
170680.	2.	11.0	10.50	0.0	0.0	0.0	0.0	0.0	1060.	0.0	0.0	0.0
170680.	2.	12.0	10.30	0.0	0.0	0.0	0.0	0.0	1050.	0.0	0.0	0.0
170680.	2.	13.0	0.0	8.70	71.00	140.00	467.70	39.00	0.	0.026	0.003	0.120
170680.	2.	15.0	0.0	0.0	95.00	190.00	449.90	38.50	0.	0.023	0.005	0.093
170680.	3.	0.0	18.60	8.14	77.00	205.00	432.10	38.50	1230.	0.014	0.008	0.045
170680.	3.	1.0	18.50	8.10	78.00	210.00	462.60	37.00	1230.	0.013	0.0	0.045
170680.	3.	2.0	18.20	8.14	76.00	205.00	447.30	37.00	1220.	0.011	0.0	0.055
170680.	3.	3.0	18.00	8.14	75.00	215.00	437.20	37.00	990.	0.015	0.0	0.048
170680.	3.	4.0	17.80	0.0	0.0	0.0	0.0	0.0	1170.	0.0	0.0	0.0
170680.	3.	5.0	17.80	8.40	77.00	190.00	447.30	38.50	1160.	0.015	0.0	0.065
170680.	3.	6.0	17.00	0.0	0.0	0.0	0.0	0.0	1150.	0.0	0.0	0.0
170680.	3.	7.0	14.80	8.50	78.00	185.00	452.40	38.50	1140.	0.017	0.0	0.080
170680.	3.	8.0	12.30	0.0	0.0	0.0	0.0	0.0	1100.	0.0	0.0	0.0
170680.	3.	9.0	10.60	0.0	0.0	0.0	0.0	0.0	1070.	0.0	0.0	0.0
170680.	3.	10.0	10.40	8.62	74.00	140.00	498.20	43.00	1060.	0.019	0.010	0.140
170680.	3.	11.0	10.30	0.0	0.0	0.0	0.0	0.0	1050.	0.0	0.0	0.0
170680.	3.	12.0	10.40	0.0	0.0	0.0	0.0	0.0	1050.	0.0	0.0	0.0
170680.	3.	13.0	10.50	8.70	70.00	120.00	482.90	39.50	1050.	0.019	0.012	0.150
170680.	3.	15.0	0.0	8.70	71.00	95.00	482.90	44.00	0.	0.370	0.007	0.160
170680.	3.	18.0	0.0	0.0	73.00	175.00	452.40	37.00	0.	0.020	0.0	0.070
170680.	4.	0.0	19.00	8.13	77.00	210.00	434.60	38.00	1190.	0.013	0.004	0.055
170680.	4.	1.0	18.40	8.12	77.00	210.00	444.20	37.00	1180.	0.012	0.0	0.045
170680.	4.	2.0	18.10	8.11	77.00	210.00	439.70	37.00	1180.	0.011	0.0	0.045
170680.	4.	3.0	18.10	8.10	77.00	210.00	439.70	38.50	1180.	0.012	0.003	0.060
170680.	4.	4.0	19.10	0.0	0.0	0.0	0.0	0.0	1190.	0.0	0.0	0.0
170680.	4.	5.0	17.00	8.10	78.00	205.00	432.10	36.50	1160.	0.015	0.0	0.043
170680.	4.	6.0	14.90	0.0	0.0	0.0	0.0	0.0	1140.	0.0	0.0	0.0
170680.	4.	7.0	12.50	8.35	78.00	195.00	439.70	40.00	1100.	0.016	0.0	0.065
170680.	4.	8.0	12.00	0.0	0.0	0.0	0.0	0.0	1080.	0.0	0.0	0.0
170680.	4.	9.0	11.40	0.0	0.0	0.0	0.0	0.0	1070.	0.0	0.0	0.0
170680.	4.	10.0	11.40	8.70	73.00	130.00	480.40	42.00	1070.	0.023	0.006	0.110
170680.	4.	11.0	11.10	0.0	0.0	0.0	0.0	0.0	1070.	0.0	0.0	0.0
170680.	4.	12.0	11.00	0.0	0.0	0.0	0.0	0.0	1070.	0.0	0.0	0.0

170680.	4.	13.0	10.90	8.70	71.00	130.00	462.60	45.00	1060.	0.026	0.0	0.150
170680.	4.	14.0	10.80	0.0	0.0	0.0	0.0	0.0	1010.	0.0	0.0	0.0
170680.	4.	15.0	10.60	0.0	0.0	0.0	0.0	0.0	970.	0.0	0.0	0.0
170680.	4.	16.0	0.0	8.70	90.00	95.00	559.20	75.00	0.	0.210	0.065	0.380
170680.	4.	18.0	0.0	8.70	90.00	40.00	508.30	80.00	0.	0.230	0.095	0.410
170680.	5.	0.0	19.10	8.10	82.00	195.00	455.00	39.00	1190.	0.009	0.0	0.055
170680.	5.	1.0	19.00	8.15	76.00	210.00	444.80	39.50	1190.	0.008	0.0	0.050
170680.	5.	2.0	18.50	8.13	76.00	200.00	439.70	39.50	1190.	0.009	0.0	0.055
170680.	5.	3.0	18.00	8.14	76.00	205.00	449.90	38.50	1180.	0.008	0.0	0.065
170680.	5.	4.0	17.90	0.0	0.0	0.0	0.0	0.0	1180.	0.0	0.0	0.0
170680.	5.	5.0	19.30	8.20	78.00	195.00	439.70	39.00	1180.	0.010	0.0	0.062
170680.	5.	6.0	17.70	0.0	0.0	0.0	0.0	0.0	1170.	0.0	0.0	0.0
170680.	5.	7.0	15.30	8.48	73.00	180.00	449.90	40.00	1140.	0.016	0.0	0.100
170680.	5.	8.0	13.80	0.0	0.0	0.0	0.0	0.0	1120.	0.0	0.0	0.0
170680.	5.	9.0	13.10	0.0	0.0	0.0	0.0	0.0	1090.	0.0	0.0	0.0
170680.	5.	10.0	13.20	8.65	72.00	135.00	467.70	39.00	1090.	0.014	0.004	0.120
170680.	5.	11.0	13.30	0.0	0.0	0.0	0.0	0.0	1090.	0.0	0.0	0.0
170680.	5.	12.0	13.40	0.0	0.0	0.0	0.0	0.0	1080.	0.0	0.0	0.0
170680.	5.	13.0	13.40	8.68	70.00	120.00	477.80	40.50	1060.	0.020	0.0	0.120
170680.	5.	14.0	12.80	0.0	0.0	0.0	0.0	0.0	1040.	0.0	0.0	0.0
170680.	5.	15.0	0.0	8.70	72.00	105.00	493.10	40.50	0.	0.020	0.0	0.110
170680.	6.	0.0	18.70	8.15	76.00	205.00	437.20	38.00	1200.	0.015	0.0	0.095
170680.	6.	1.0	18.70	8.10	75.00	200.00	432.10	40.00	1190.	0.010	0.0	0.060
170680.	6.	2.0	18.60	8.10	75.00	205.00	437.20	37.50	1190.	0.011	0.0	0.048
170680.	6.	3.0	18.00	8.10	79.00	205.00	437.20	38.50	1190.	0.010	0.0	0.055
170680.	6.	4.0	17.80	0.0	0.0	0.0	0.0	0.0	1190.	0.0	0.0	0.0
170680.	6.	5.0	19.90	8.12	75.00	205.00	442.20	39.00	1190.	0.015	0.0	0.068
170680.	6.	6.0	17.60	0.0	0.0	0.0	0.0	0.0	1170.	0.0	0.0	0.0
170680.	6.	7.0	14.70	8.50	94.00	220.00	533.70	52.50	1150.	0.140	0.0	0.0
170680.	6.	8.0	13.70	0.0	0.0	0.0	0.0	0.0	1140.	0.0	0.0	0.0
170680.	6.	9.0	12.20	0.0	0.0	0.0	0.0	0.0	1100.	0.0	0.0	0.0
170680.	6.	10.0	12.10	8 60	92.00	200.00	538.80	56.50	1100.	0.170	0.0	0.260
170680.	7.	0.0	18.30	8.14	95.00	245.00	528.70	51.50	1160.	0.078	0.0	0.090
170680.	7.	1.0	18.20	8.12	95.00	255.00	513.40	52.50	1180.	0.071	0.0	0.088
170680.	7.	2.0	17.80	8.15	94.00	240.00	505.80	52.00	1180.	0.070	0.0	0.110
170680.	7.	3.0	17.70	8.15	95.00	255.00	508.30	52.50	1180.	0.220	0.0	0.230
170680.	8.	0.0	18.80	8.12	75.00	200.00	437.20	40.50	1200.	0.014	0.0	0.055
170680.	8.	1.0	18.50	8.20	75.00	205.00	429.50	40.50	1170.	0.013	0.0	0.045
170680.	8.	2.0	18.00	8.12	76.00	195.00	432.10	40.50	1180.	0.015	0.0	0.048
170680.	8.	3.0	18.00	8.14	75.00	205.00	432.10	40.50	1180.	0.012	0.0	0.053
170680.	8.	4.0	17.90	0.0	0.0	0.0	0.0	0.0	1180.	0.0	0.0	0.0
170680.	8.	5.0	17.90	8.38	75.00	190.00	432.10	38.50	1170.	0.018	0.0	0.065
170680.	8.	6.0	16.90	0.0	0.0	0.0	0.0	0.0	1160.	0.0	0.0	0.0
170680.	8.	7.0	15.60	8.42	75.00	190.00	439.70	40.50	1160.	0.024	0.0	0.080
170680.	9.	0.0	19.10	0.0	0.0	0.0	0.0	0.0	650.	0.0	0.0	0.0
170680.	9.	1.0	19.00	0.0	0.0	0.0	0.0	0.0	760.	0.0	0.0	0.0
170680.	9.	2.0	18.90	0.0	0.0	0.0	0.0	0.0	860.	0.0	0.0	0.0
170680.	9.	3.0	18.10	0.0	0.0	0.0	0.0	0.0	920.	0.0	0.0	0.0
170680.	9.	4.0	18.00	0.0	0.0	0.0	0.0	0.0	950.	0.0	0.0	0.0
170680.	9.	5.0	19.40	0.0	0.0	0.0	0.0	0.0	980.	0.0	0.0	0.0
170680.	9.	6.0	16.90	0.0	0.0	0.0	0.0	0.0	980.	0.0	0.0	0.0
170680.	9.	7.0	15.10	0.0	0.0	0.0	0.0	0.0	980.	0.0	0.0	0.0
170680.	9.	8.0	14.60	0.0	0.0	0.0	0.0	0.0	980.	0.0	0.0	0.0
170680.	9.	9.0	14.40	0.0	0.0	0.0	0.0	0.0	1000.	0.0	0.0	0.0
170680.	9.	10.0	14.20	0.0	0.0	0.0	0.0	0.0	1000.	0.0	0.0	0.0
170680.	10.	0.0	19.40	8.22	76.00	205.00	432.10	41.50	1210.	0.014	0.0	0.040
170680.	10.	1.0	19.30	8.20	76.00	200.00	429.50	40.00	1210.	0.011	0.0	0.050
170680.	10.	2.0	19.10	8.18	76.00	200.00	439.70	40.50	1210.	0.013	0.0	0.040
170680.	10.	3.0	17.80	8.19	76.00	195.00	427.00	41.00	1200.	0.015	0.0	0.050
170680.	10.	4.0	18.10	0.0	0.0	0.0	0.0	0.0	1200.	0.0	0.0	0.0

170680.	10.	5.0	18.40	8.30	76.00	190.00	437.20	40.00	1200.	0.015	0.0	0.070
170680.	11.	0.0	19.40	0.0	0.0	0.0	0.0	0.0	950.	0.0	0.0	0.0
170680.	11.	1.0	19.40	0.0	0.0	0.0	0.0	0.0	980.	0.0	0.0	0.0
170680.	11.	2.0	19.30	0.0	0.0	0.0	0.0	0.0	1010.	0.0	0.0	0.0
170680.	11.	3.0	19.00	0.0	0.0	0.0	0.0	0.0	1040.	0.0	0.0	0.0
170680.	11.	4.0	17.80	0.0	0.0	0.0	0.0	0.0	1000.	0.0	0.0	0.0

DATE	STAT	DEPTH	BITUMEN	TSOLIDS	SPMGRAV	NA	K	CA	MG	FE	MN	AL
170680.	1.	0.0	374.0	0.81	0.70	266.20	13.93	6.85	4.84	2.5500	0.0418	9.1100
170680.	1.	1.0	380.0	0.81	0.70	265.20	13.76	6.87	4.83	2.4090	0.0438	8.6160
170680.	1.	2.0	389.0	0.81	0.69	264.90	13.83	6.58	4.77	2.5800	0.0443	9.2760
170680.	1.	3.0	363.0	0.81	0.70	275.10	14.91	6.77	4.88	2.6780	0.0424	9.5550
170680.	1.	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
170680.	1.	5.0	374.0	0.80	0.69	268.50	14.29	6.51	4.66	2.3650	0.0412	8.4680
170680.	1.	6.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
170680.	1.	7.0	599.0	1.21	1.08	270.10	16.46	6.30	5.19	3.9320	0.0479	14.0600
170680.	1.	8.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
170680.	1.	9.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
170680.	1.	10.0	1384.0	2.36	2.23	278.90	22.26	4.83	5.81	9.3360	0.1010	32.8900
170680.	1.	11.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
170680.	1.	12.0	2287.0	3.09	2.79	262.80	22.95	4.52	6.00	11.1900	0.0803	37.8100
170680.	1.	14.0	18717.0	0.0	9.38	254.80	17.68	3.89	4.76	6.9720	0.0513	22.0500
170680.	2.	0.0	376.0	0.81	0.69	265.80	15.20	6.33	4.56	2.5690	0.0442	9.1430
170680.	2.	1.0	379.0	0.81	0.68	266.10	16.11	6.58	4.86	3.0740	0.0491	11.4800
170680.	2.	2.0	387.0	0.81	0.69	264.40	15.32	6.65	4.81	2.7130	0.0465	9.7150
170680.	2.	3.0	379.0	0.81	0.68	264.10	12.95	6.29	4.57	2.5900	0.0409	9.3710
170680.	2.	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
170680.	2.	5.0	641.0	1.28	1.11	265.30	15.18	5.00	4.74	5.1520	0.0478	18.5700
170680.	2.	6.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
170680.	2.	7.0	1085.0	1.97	1.81	264.20	17.13	4.75	5.01	7.1120	0.0574	25.2700
170680.	2.	8.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
170680.	2.	9.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
170680.	2.	10.0	1388.0	2.33	2.18	271.20	19.86	4.86	5.69	9.9840	0.0695	34.9500
170680.	2.	11.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
170680.	2.	12.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
170680.	2.	13.0	1981.0	3.27	2.96	259.10	17.65	4.25	4.75	8.4890	0.0584	27.6900
170680.	2.	15.0	1348.0	0.0	0.0	265.50	13.48	5.13	3.94	2.9410	0.0356	9.1800
170680.	3.	0.0	341.0	0.81	0.70	268.50	12.50	6.53	4.71	2.3950	0.0383	8.3810
170680.	3.	1.0	323.0	0.81	0.69	266.70	12.15	6.30	4.34	1.8840	0.0349	6.5050
170680.	3.	2.0	373.0	0.81	0.69	266.40	12.30	6.37	4.40	2.1010	0.0374	7.1990
170680.	3.	3.0	374.0	0.81	0.68	274.10	12.41	6.30	4.46	2.3150	0.0590	7.9980
170680.	3.	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
170680.	3.	5.0	622.0	1.20	1.09	272.40	13.76	5.10	4.35	3.8520	0.0426	13.3600
170680.	3.	6.0	997.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
170680.	3.	7.0	1988.0	1.89	1.77	270.40	15.33	4.68	4.54	5.5270	0.0481	19.0300
170680.	3.	8.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
170680.	3.	9.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
170680.	3.	10.0	2441.0	3.17	3.01	269.40	19.01	4.61	5.64	10.7800	0.0708	35.9200
170680.	3.	11.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
170680.	3.	12.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
170680.	3.	13.0	5053.0	3.96	3.79	259.70	18.12	4.55	5.56	11.2100	0.0771	37.2500
170680.	3.	15.0	2384.0	5.90	5.72	252.10	16.55	3.63	5.13	10.4500	0.0666	32.6000
170680.	3.	18.0	0.0	0.0	0.0	263.80	12.67	4.69	4.30	4.4530	0.0433	13.9600
170680.	4.	0.0	386.0	0.81	0.69	265.20	11.26	6.28	4.49	2.4660	0.0381	8.8830
170680.	4.	1.0	408.0	0.81	0.69	266.40	10.91	6.54	4.48	2.0560	0.0375	7.3320
170680.	4.	2.0	371.0	0.82	0.69	273.70	10.95	6.41	4.56	2.2630	0.0341	7.8890
170680.	4.	3.0	388.0	0.82	0.69	269.90	11.44	6.42	4.73	2.7330	0.0390	10.2400
170680.	4.	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
170680.	4.	5.0	382.0	0.84	0.73	267.70	11.02	6.17	4.37	2.1280	0.0353	7.4410
170680.	4.	6.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
170680.	4.	7.0	707.0	1.43	1.31	267.60	14.39	4.88	4.27	3.7910	0.0388	13.2000
170680.	4.	8.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
170680.	4.	9.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
170680.	4.	10.0	1805.0	3.20	2.90	259.70	16.92	4.23	4.48	7.7160	0.0571	25.0800
170680.	4.	11.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
170680.	4.	12.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

170680.	4.	13.0	2120.0	4.08	3.83	256.60	17.72	4.26	4.97	9.5130	0.0657	31.0300
170680.	4.	14.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
170680.	4.	15.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
170680.	4.	16.0	5301.0	10.80	10.52	316.10	33.74	4.54	9.86	26.2300	0.1518	80.2900
170680.	4.	18.0	5023.0	12.94	12.68	278.10	38.49	3.69	11.54	33.4300	0.1825	*******
170680.	5.	0.0	368.0	0.81	0.67	266.90	12.22	6.42	4.61	2.6500	0.0390	9.5580
170680.	5.	1.0	387.0	0.81	0.68	273.40	9.79	6.66	4.65	2.3070	0.0396	8.3140
170680.	5.	2.0	386.0	0.82	0.70	268.70	6.23	6.73	4.63	2.2100	0.0400	7.8390
170680.	5.	3.0	374.0	0.82	0.70	268.40	6.18	6.49	4.50	2.0740	0.0387	7.4280
170680.	5.	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
170680.	5.	5.0	451.0	0.99	0.84	278.30	7.29	5.97	4.73	3.0480	0.0833	10.9500
170680.	5.	6.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
170680.	5.	7.0	972.0	1.82	1.67	270.20	8.45	4.89	4.90	6.2390	0.0548	22.2200
170680.	5.	8.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
170680.	5.	9.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
170680.	5.	10.0	1896.0	3.09	2.85	261.40	8.13	4.25	4.31	6.9020	0.0531	22.4300
170680.	5.	11.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
170680.	5.	12.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
170680.	5.	13.0	2410.0	4.04	3.80	252.10	9.74	4.13	4.51	8.1190	0.0598	26.0700
170680.	5.	14.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
170680.	5.	15.0	6240.0	4.75	4.23	252.70	8.38	3.78	3.86	6.2940	0.0479	19.3000
170680.	6.	0.0	344.0	0.81	0.67	266.00	7.04	6.65	4.45	1.8830	0.0380	6.4910
170680.	6.	1.0	367.0	0.81	0.68	277.40	8.20	6.59	4.80	2.9510	0.0406	11.7900
170680.	6.	2.0	344.0	0.81	0.69	272.30	7.61	6.44	4.54	2.5450	0.0399	9.6330
170680.	6.	3.0	343.0	0.81	0.67	265.70	7.57	6.45	4.36	1.9600	0.0374	6.9170
170680.	6.	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
170680.	6.	5.0	574.0	1.22	1.07	270.20	8.00	5.35	4.36	3.4340	0.0421	12.2100
170680.	6.	6.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
170680.	6.	7.0	1086.0	1.97	1.84	326.80	15.35	6.64	8.01	13.7200	0.0991	51.3700
170680.	6.	8.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
170680.	6.	9.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
170680.	6.	10.0	1359.0	2.56	2.42	324.30	16.99	6.54	8.80	17.5000	0.1173	64.1200
170680.	7.	0.0	348.0	0.81	0.69	333.70	9.94	8.09	6.24	4.6750	0.1072	17.7300
170680.	7.	1.0	377.0	0.81	0.69	332.30	9.65	8.09	6.13	4.6000	0.0593	17.4400
170680.	7.	2.0	393.0	0.81	0.68	328.00	9.46	7.96	6.12	4.6320	0.0587	17.7400
170680.	7.	3.0	340.0	0.81	0.68	338.20	17.47	7.95	6.25	4.8930	0.0580	18.9900
170680.	8.	0.0	330.0	0.80	0.70	271.10	12.05	6.21	4.35	2.0470	0.0370	7.1210
170680.	8.	1.0	324.0	0.80	0.70	270.60	11.96	6.39	4.38	1.9830	0.0370	6.8500
170680.	8.	2.0	366.0	0.80	0.70	279.00	12.33	6.43	4.53	2.2430	0.0341	7.6690
170680.	8.	3.0	0.0	0.80	0.70	274.50	12.22	6.47	4.52	2.2070	0.0387	7.6540
170680.	8.	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
170680.	8.	5.0	1476.0	1.53	1.41	275.10	13.89	5.02	4.31	3.8130	0.0415	13.1300
170680.	8.	6.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
170680.	8.	7.0	1162.0	2.15	1.99	281.40	15.38	5.02	4.76	5.2990	0.0861	18.2000
170680.	9.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
170680.	9.	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
170680.	9.	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
170680.	9.	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
170680.	9.	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
170680.	9.	5.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
170680.	9.	6.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
170680.	9.	7.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
170680.	9.	8.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
170680.	9.	9.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
170680.	9.	10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
170680.	10.	0.0	376.0	0.80	0.69	273.30	11.95	6.73	4.58	2.0920	0.0375	7.2060
170680.	10.	1.0	374.0	0.80	0.70	272.40	11.87	6.68	4.49	1.9870	0.0368	6.8190
170680.	10.	2.0	375.0	0.80	0.70	266.90	11.80	6.65	4.57	2.0890	0.0393	7.2320
170680.	10.	3.0	390.0	0.84	0.73	265.60	11.66	6.08	4.43	2.4120	0.0394	8.4120
170680.	10.	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

170680.	10.	5.0	535.0	1.04	0.92	268.40	12.41	5.47	4.42	3.3190	0.0406	11.4700
170680.	11.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
170680.	11.	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
170680.	11.	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
170680.	11.	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
170680.	11.	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

DATE	STAT	DEPTH	V	TI	CO	MO	CD	ZN	B	BA	PB
170680.	1.	0.0	0.0248	0.1407	0.0190	0.1661	0.0173	0.0044	1.0670	0.0742	0.0747
170680.	1.	1.0	0.0216	0.1309	0.0220	0.0583	0.0065	0.0038	0.9396	0.0747	0.0644
170680.	1.	2.0	0.0230	0.1554	0.0195	0.0576	0.0071	0.0038	0.9086	0.0746	0.0742
170680.	1.	3.0	0.0286	0.1720	0.0270	0.0672	0.0278	0.0045	0.9877	0.1112	0.0978
170680.	1.	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
170680.	1.	5.0	0.0255	0.1108	0.0282	0.0670	0.0281	0.0053	0.8939	0.0745	0.0794
170680.	1.	6.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
170680.	1.	7.0	0.0325	0.2154	0.0363	0.0753	0.0235	0.0075	0.8921	0.0744	0.0842
170680.	1.	8.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
170680.	1.	9.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
170680.	1.	10.0	0.0663	0.2820	0.1045	0.0865	0.0539	0.0438	1.0190	0.0851	0.1092
170680.	1.	11.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
170680.	1.	12.0	0.0756	0.2966	0.0907	0.0826	0.0301	0.0200	0.8747	0.0927	0.0757
170680.	1.	14.0	0.0516	0.1227	0.0629	0.0728	0.0353	0.0191	0.7988	0.0644	0.0958
170680.	2.	0.0	0.0285	0.1499	0.0368	0.0747	0.0258	0.0057	0.8953	0.0763	0.0818
170680.	2.	1.0	0.0306	0.2099	0.0435	0.0668	0.0313	0.0064	0.8143	0.0817	0.0983
170680.	2.	2.0	0.0267	0.1348	0.0406	0.0660	0.0390	0.0065	0.7678	0.0791	0.1026
170680.	2.	3.0	0.0188	0.1255	0.0216	0.0601	0.0180	0.0013	0.8999	0.0711	0.0200
170680.	2.	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
170680.	2.	5.0	0.0347	0.2275	0.0446	0.0767	0.0050	0.0064	0.9508	0.0741	0.0250
170680.	2.	6.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
170680.	2.	7.0	0.0468	0.2579	0.0662	0.0720	0.0030	0.0104	0.9537	0.0802	0.0260
170680.	2.	8.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
170680.	2.	9.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
170680.	2.	10.0	0.0579	0.4335	0.0910	0.0671	0.0370	0.0131	1.0160	0.1086	0.0570
170680.	2.	11.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
170680.	2.	12.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
170680.	2.	13.0	0.0421	0.2141	0.0699	0.0661	0.0520	0.0105	0.9194	0.0736	0.0660
170680.	2.	15.0	0.0134	0.0528	0.0232	0.0517	0.0260	0.0024	0.8867	0.0580	0.0320
170680.	3.	0.0	0.0138	0.1159	0.0383	0.0985	0.0210	0.0073	1.0460	0.0699	0.0280
170680.	3.	1.0	0.0097	0.1089	0.0253	0.0510	0.0160	0.0010	0.9474	0.0657	0.0150
170680.	3.	2.0	0.0080	0.1039	0.0277	0.0475	0.0180	0.0014	0.8918	0.0672	0.0250
170680.	3.	3.0	0.0107	0.1207	0.0562	0.0220	0.0160	0.0208	0.9201	0.0629	0.0200
170680.	3.	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
170680.	3.	5.0	0.0194	0.1668	0.0574	0.0179	0.0340	0.0037	0.9191	0.0664	0.0400
170680.	3.	6.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
170680.	3.	7.0	0.0317	0.2086	0.0850	0.0225	0.0320	0.0055	0.9151	0.0694	0.0280
170680.	3.	8.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
170680.	3.	9.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
170680.	3.	10.0	0.0606	0.3552	0.1593	0.0665	0.0130	0.0159	0.9754	0.1381	0.0300
170680.	3.	11.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
170680.	3.	12.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
170680.	3.	13.0	0.0610	0.2763	0.1646	0.0686	0.0300	0.0171	0.9066	0.0889	0.0420
170680.	3.	15.0	0.0550	0.1808	0.1534	0.0624	0.0240	0.0250	0.8456	0.0704	0.0350
170680.	3.	18.0	0.0204	0.0794	0.0630	0.0839	0.0210	0.0040	0.9919	0.0576	0.0180
170680.	4.	0.0	0.0112	0.1208	0.0367	0.0163	0.0210	0.0008	0.9088	0.0681	0.0230
170680.	4.	1.0	0.0076	0.1084	0.0301	0.0037	0.0180	0.0	0.8843	0.0691	0.0180
170680.	4.	2.0	0.0111	0.1896	0.0343	0.0253	0.0190	0.0	0.8983	0.1369	0.0140
170680.	4.	3.0	0.0137	0.1499	0.0424	0.0395	0.0220	0.0017	0.8763	0.0723	0.0220
170680.	4.	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
170680.	4.	5.0	0.0100	0.0760	0.0329	0.0320	0.0180	0.0006	0.8441	0.0653	0.0110
170680.	4.	6.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
170680.	4.	7.0	0.0246	0.1183	0.0571	0.0742	0.0030	0.0040	0.9257	0.0634	0.0200
170680.	4.	8.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
170680.	4.	9.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
170680.	4.	10.0	0.0443	0.1932	0.1137	0.0801	0.0170	0.0114	0.9325	0.0695	0.0440
170680.	4.	11.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
170680.	4.	12.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

170680.	4.	13.0	0.0600	0.2232	0.1434	0.0940	0.0050	0.0158	0.9230	0.0787	0.0190
170680.	4.	14.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
170680.	4.	15.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
170680.	4.	16.0	0.1475	0.5074	0.3963	0.1720	0.0	0.0487	1.5170	0.1733	0.0620
170680.	4.	18.0	0.1832	0.5748	0.5053	0.1886	0.0124	0.0626	1.4870	0.1550	0.0720
170680.	5.	0.0	0.0165	0.1339	0.0357	0.0703	0.0200	0.0024	0.8798	0.0721	0.0330
170680.	5.	1.0	0.0169	0.1348	0.0370	0.0635	0.0090	0.0017	1.0580	0.0734	0.0180
170680.	5.	2.0	0.0152	0.1121	0.0372	0.0651	0.0130	0.0016	0.9665	0.0735	0.0260
170680.	5.	3.0	0.0159	0.1159	0.0329	0.0628	0.0070	0.0010	0.9342	0.0709	0.0230
170680.	5.	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
170680.	5.	5.0	0.0213	0.1572	0.0953	0.0665	0.0380	0.0446	0.9590	0.0620	0.0263
170680.	5.	6.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
170680.	5.	7.0	0.0425	0.2590	0.1072	0.0762	0.0024	0.0090	0.9665	0.0756	0.0170
170680.	5.	8.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
170680.	5.	9.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
170680.	5.	10.0	0.0437	0.1916	0.1119	0.0785	0.0070	0.0102	0.9347	0.0707	0.0360
170680.	5.	11.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
170680.	5.	12.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
170680.	5.	13.0	0.0526	0.2191	0.1346	0.1246	0.0060	0.0139	1.0960	0.0737	0.0340
170680.	5.	14.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
170680.	5.	15.0	0.0420	0.1122	0.0993	0.0782	0.0110	0.0129	1.0130	0.0604	0.0150
170680.	6.	0.0	0.0131	0.0907	0.0295	0.0647	0.0110	0.0021	0.9620	0.0716	0.0060
170680.	6.	1.0	0.0220	0.2472	0.0462	0.0751	0.0045	0.0326	1.0130	0.0981	0.0060
170680.	6.	2.0	0.0202	0.1865	0.0419	0.0700	0.0010	0.0052	0.9688	0.0777	0.0060
170680.	6.	3.0	0.0148	0.1253	0.0353	0.0659	0.0025	0.0030	0.9435	0.0722	0.0012
170680.	6.	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
170680.	6.	5.0	0.0224	0.1629	0.0571	0.1195	0.0030	0.0057	1.1030	0.0732	0.0120
170680.	6.	6.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
170680.	6.	7.0	0.0835	0.5799	0.2218	0.1355	0.0190	0.0323	1.2840	0.1346	0.0220
170680.	6.	8.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
170680.	6.	9.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
170680.	6.	10.0	0.1032	0.6892	0.2803	0.1483	0.0229	0.0303	1.2880	0.1479	0.0
170680.	7.	0.0	0.0275	0.2732	0.1291	0.0860	0.0356	0.0581	1.1840	0.0944	0.0233
170680.	7.	1.0	0.0266	0.2813	0.0742	0.0855	0.0	0.0079	1.1700	0.1011	0.0
170680.	7.	2.0	0.0267	0.2664	0.0698	0.0902	0.0	0.0083	1.1430	0.0997	0.0
170680.	7.	3.0	0.0393	0.3222	0.0114	0.1711	0.0335	0.0072	1.3200	0.1003	0.0489
170680.	8.	0.0	0.0211	0.0987	0.0061	0.0531	0.0324	0.0009	0.9865	0.0685	0.0506
170680.	8.	1.0	0.0210	0.0951	0.0138	0.0605	0.0358	0.0011	0.9595	0.0691	0.0623
170680.	8.	2.0	0.0220	0.1292	0.0117	0.0714	0.0387	0.0022	0.9648	0.0881	0.0578
170680.	8.	3.0	0.0228	0.1099	0.0102	0.0783	0.0423	0.0021	0.9424	0.0727	0.0605
170680.	8.	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
170680.	8.	5.0	0.0331	0.1453	0.0121	0.0866	0.0379	0.0048	0.9730	0.0687	0.0520
170680.	8.	6.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
170680.	8.	7.0	0.0436	0.1688	0.0567	0.0937	0.0890	0.0461	1.0040	0.0633	0.1064
170680.	9.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
170680.	9.	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
170680.	9.	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
170680.	9.	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
170680.	9.	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
170680.	9.	5.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
170680.	9.	6.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
170680.	9.	7.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
170680.	9.	8.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
170680.	9.	9.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
170680.	9.	10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
170680.	10.	0.0	0.0254	0.1017	0.0149	0.0417	0.0508	0.0050	0.9358	0.0728	0.0756
170680.	10.	1.0	0.0251	0.1130	0.0155	0.0451	0.0543	0.0021	0.9378	0.0724	0.0851
170680.	10.	2.0	0.0267	0.1034	0.0154	0.0666	0.0620	0.0030	1.0680	0.0733	0.0942
170680.	10.	3.0	0.0273	0.1113	0.0185	0.0627	0.0631	0.0031	1.0120	0.0698	0.0927
170680.	10.	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

170680.	10.	5.0	0.0334	0.1379	0.0216	0.0665	0.0676	0.0048	1.0240	0.0698	0.0971
170680.	11.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
170680.	11.	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
170680.	11.	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
170680.	11.	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
170680.	11.	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

DATE	STAT	DEPTH	TEMP	PH	CHLOR	SULPH	BICARB	TOC	CONDUCT	NITRITE	NITRATE	PO4
220780.	1.	0.0	20.80	7.83	78.00	193.00	478.00	39.30	1100.	0.008	0.005	0.030
220780.	1.	1.0	20.75	7.83	80.00	200.00	475.00	40.90	1130.	0.010	0.005	0.040
220780.	1.	2.0	20.75	7.83	79.00	193.00	475.00	41.40	1180.	0.009	0.004	0.030
220780.	1.	3.0	20.65	7.84	78.00	200.00	468.00	45.50	1240.	0.011	0.0	0.040
220780.	1.	4.0	20.55	7.86	0.0	0.0	0.0	0.0	1350.	0.0	0.0	0.0
220780.	1.	5.0	21.00	7.95	81.00	197.00	473.00	41.80	1350.	0.011	0.0	0.040
220780.	1.	6.0	20.60	8.06	0.0	0.0	0.0	0.0	1430.	0.0	0.0	0.0
220780.	1.	7.0	18.05	8.19	82.00	208.00	480.00	42.30	1430.	0.013	0.003	0.030
220780.	1.	8.0	15.55	8.29	0.0	0.0	0.0	0.0	1450.	0.0	0.0	0.0
220780.	1.	9.0	14.35	8.29	0.0	0.0	0.0	0.0	1420.	0.0	0.0	0.0
220780.	1.	10.0	13.30	8.41	80.00	165.00	513.00	43.80	1390.	0.024	0.004	0.060
220780.	1.	11.0	12.05	8.38	0.0	0.0	0.0	0.0	1370.	0.0	0.0	0.0
220780.	1.	12.0	0.0	0.0	77.00	140.00	508.00	44.00	0.	0.024	0.005	0.110
220780.	1.	15.0	0.0	0.0	78.00	153.00	529.00	51.80	0.	0.022	0.0	0.080
220780.	2.	0.0	21.00	8.06	79.00	193.00	485.00	42.50	720.	0.011	0.0	0.040
220780.	2.	1.0	20.85	7.99	80.00	193.00	475.00	41.50	770.	0.008	0.0	0.030
220780.	2.	2.0	20.55	7.98	78.00	192.00	468.00	41.00	900.	0.009	0.0	0.030
220780.	2.	3.0	20.50	7.98	78.00	197.00	473.00	41.70	1020.	0.015	0.003	0.060
220780.	2.	4.0	20.45	7.97	0.0	0.0	0.0	0.0	1100.	0.0	0.0	0.0
220780.	2.	5.0	20.45	8.07	80.00	193.00	473.00	42.50	1140.	0.011	0.0	0.040
220780.	2.	6.0	18.20	8.16	0.0	0.0	0.0	0.0	1150.	0.0	0.0	0.0
220780.	2.	7.0	17.35	8.24	80.00	182.00	508.00	43.50	1190.	0.015	0.004	0.060
220780.	2.	8.0	15.25	8.33	0.0	0.0	0.0	0.0	1230.	0.0	0.0	0.0
220780.	2.	9.0	12.75	8.43	0.0	0.0	0.0	0.0	1280.	0.0	0.0	0.0
220780.	2.	10.0	12.15	8.47	80.00	158.00	519.00	43.50	1280.	0.015	0.010	0.080
220780.	2.	11.0	11.75	8.43	0.0	0.0	0.0	0.0	1290.	0.0	0.0	0.0
220780.	2.	12.0	11.65	8.43	0.0	0.0	0.0	0.0	1300.	0.0	0.0	0.0
220780.	2.	13.0	11.35	8.46	72.00	123.00	519.00	46.00	1280.	0.025	0.010	0.110
220780.	2.	14.0	11.00	8.48	0.0	0.0	0.0	0.0	1230.	0.0	0.0	0.0
220780.	2.	15.0	10.30	8.50	0.0	0.0	0.0	0.0	1230.	0.0	0.0	0.0
220780.	2.	16.0	10.80	8.48	50.00	23.40	488.00	53.30	1210.	0.031	0.026	0.230
220780.	3.	0.0	21.00	7.96	79.00	196.00	485.00	43.70	830.	0.010	0.011	0.060
220780.	3.	1.0	20.90	7.95	83.00	200.00	485.00	45.50	910.	0.016	0.017	0.080
220780.	3.	2.0	20.60	7.95	80.00	196.00	468.00	42.50	1000.	0.006	0.006	0.040
220780.	3.	3.0	20.30	7.96	82.00	198.00	473.00	43.00	1090.	0.005	0.006	0.225
220780.	3.	4.0	20.20	7.99	0.0	0.0	0.0	0.0	1140.	0.0	0.0	0.0
220780.	3.	5.0	21.05	8.04	80.00	195.00	473.00	42.50	1170.	0.006	0.007	0.040
220780.	3.	6.0	18.95	8.09	0.0	0.0	0.0	0.0	1210.	0.0	0.0	0.0
220780.	3.	7.0	15.75	8.26	82.00	184.00	483.00	42.60	1230.	0.008	0.010	0.050
220780.	3.	8.0	13.90	8.30	0.0	0.0	0.0	0.0	1270.	0.0	0.0	0.0
220780.	3.	9.0	13.35	8.35	0.0	0.0	0.0	0.0	1300.	0.0	0.0	0.0
220780.	3.	10.0	13.85	8.29	76.00	152.00	485.00	43.10	1320.	0.032	0.021	0.140
220780.	3.	11.0	13.15	8.34	0.0	0.0	0.0	0.0	1320.	0.0	0.0	0.0
220780.	3.	12.0	12.65	8.38	0.0	0.0	0.0	0.0	1320.	0.0	0.0	0.0
220780.	3.	13.0	0.0	0.0	72.00	122.00	534.00	44.20	0.	0.021	0.005	0.120
220780.	4.	0.0	21.45	7.92	80.00	195.00	470.00	43.40	240.	0.012	0.0	0.080
220780.	4.	1.0	21.50	7.92	81.00	195.00	470.00	43.30	310.	0.013	0.0	0.030
220780.	4.	2.0	21.30	7.93	81.00	193.00	483.00	44.00	410.	0.014	0.0	0.040
220780.	4.	3.0	21.25	7.92	80.00	195.00	478.00	43.70	570.	0.013	0.0	0.050
220780.	4.	4.0	21.10	7.91	0.0	0.0	0.0	0.0	780.	0.0	0.0	0.0
220780.	4.	5.0	20.20	7.93	80.00	196.00	478.00	44.80	930.	0.013	0.0	0.060
220780.	5.	0.0	21.45	8.02	81.00	195.00	478.00	43.00	500.	0.011	0.0	0.070
220780.	5.	1.0	21.35	7.99	80.00	195.00	475.00	43.80	580.	0.011	0.0	0.040
220780.	5.	2.0	21.15	7.97	82.00	191.00	483.00	43.00	830.	0.019	0.004	0.060
220780.	5.	3.0	21.05	7.97	81.00	192.00	473.00	41.60	970.	0.015	0.0	0.070
220780.	5.	4.0	20.60	7.99	0.0	0.0	0.0	0.0	1020.	0.0	0.0	0.0
220780.	5.	5.0	19.70	7.99	83.00	192.00	478.00	40.00	1080.	0.019	0.003	0.090
220780.	5.	6.0	19.25	8.09	0.0	0.0	0.0	0.0	1080.	0.0	0.0	0.0

220780.	5.	7.0	18.80	7.89	0.0	0.0	0.0	0.0	970.	0.0	0.0	0.0
220780.	6.	0.0	20.80	8.16	82.00	193.00	483.00	42.40	1130.	0.015	0.003	0.060
220780.	6.	1.0	20.50	8.08	81.00	190.00	478.00	40.70	1150.	0.015	0.0	0.060
220780.	6.	2.0	20.45	8.10	83.00	193.00	475.00	43.20	1190.	0.019	0.003	0.060
220780.	6.	3.0	20.15	8.08	81.00	190.00	473.00	41.00	1230.	0.014	0.0	0.040
220780.	6.	4.0	20.30	8.01	0.0	0.0	0.0	0.0	1270.	0.0	0.0	0.0
220780.	6.	5.0	20.95	8.01	82.00	196.00	493.00	42.20	1300.	0.019	0.003	0.060
220780.	6.	6.0	18.85	7.95	0.0	0.0	0.0	0.0	1340.	0.0	0.0	0.0
220780.	6.	7.0	16.00	8.04	82.00	195.00	478.00	40.50	1340.	0.019	0.006	0.080
220780.	6.	8.0	15.85	8.03	0.0	0.0	0.0	0.0	1400.	0.0	0.0	0.0
220780.	6.	9.0	14.75	8.09	0.0	0.0	0.0	0.0	1380.	0.0	0.0	0.0
220780.	6.	10.0	14.60	8.11	80.00	163.00	501.00	41.60	1380.	0.029	0.009	0.130
220780.	6.	11.0	14.55	8.02	0.0	0.0	0.0	0.0	1370.	0.0	0.0	0.0
220780.	6.	12.0	15.65	7.98	0.0	0.0	0.0	0.0	1370.	0.0	0.0	0.0
220780.	6.	13.0	15.35	7.98	75.00	127.00	513.00	44.00	1360.	0.033	0.010	0.140
220780.	6.	14.0	14.65	8.02	0.0	0.0	0.0	0.0	1290.	0.0	0.0	0.0
220780.	6.	15.0	13.90	8.00	0.0	0.0	0.0	0.0	1240.	0.0	0.0	0.0
220780.	6.	16.0	13.85	8.01	0.0	0.0	0.0	0.0	1210.	0.0	0.0	0.0
220780.	6.	21.0	0.0	0.0	67.00	3.00	473.00	54.50	0.	0.042	0.021	0.210
220780.	7.	0.0	21.05	7.61	82.00	193.00	475.00	41.30	480.	0.016	0.0	0.040
220780.	7.	1.0	21.05	7.62	83.00	190.00	478.00	40.80	530.	0.017	0.0	0.070
220780.	7.	2.0	20.55	7.58	81.00	193.00	470.00	42.30	700.	0.016	0.0	0.070
220780.	7.	3.0	20.95	7.56	82.00	195.00	468.00	42.00	890.	0.018	0.0	0.060
220780.	7.	4.0	20.40	7.55	0.0	0.0	0.0	0.0	990.	0.0	0.0	0.0
220780.	7.	5.0	21.20	7.66	84.00	193.00	485.00	42.80	1070.	0.018	0.0	0.070
220780.	7.	6.0	19.75	7.58	0.0	0.0	0.0	0.0	1070.	0.0	0.0	0.0
220780.	7.	7.0	17.05	7.53	85.00	193.00	468.00	42.60	1100.	0.020	0.003	0.130
220780.	8.	0.0	21.05	7.86	83.00	192.00	485.00	44.10	960.	0.018	0.0	0.090
220780.	8.	1.0	20.90	7.85	83.00	192.00	468.00	42.50	990.	0.011	0.014	0.080
220780.	8.	2.0	20.80	7.83	83.00	192.00	468.00	42.00	1060.	0.016	0.003	0.080
220780.	8.	3.0	20.55	7.84	84.00	195.00	483.00	42.70	1120.	0.019	0.005	0.140
220780.	9.	0.0	21.10	7.98	0.0	0.0	0.0	0.0	1120.	0.0	0.0	0.0
220780.	9.	1.0	21.05	7.96	0.0	0.0	0.0	0.0	1130.	0.0	0.0	0.0
220780.	9.	2.0	20.95	7.93	0.0	0.0	0.0	0.0	1160.	0.0	0.0	0.0
220780.	9.	3.0	20.35	7.90	0.0	0.0	0.0	0.0	1190.	0.0	0.0	0.0
220780.	9.	4.0	20.25	7.87	0.0	0.0	0.0	0.0	1400.	0.0	0.0	0.0
220780.	9.	5.0	20.85	7.89	0.0	0.0	0.0	0.0	1430.	0.0	0.0	0.0
220780.	10.	0.0	21.50	7.95	0.0	0.0	0.0	0.0	730.	0.0	0.0	0.0
220780.	10.	1.0	21.50	7.95	0.0	0.0	0.0	0.0	890.	0.0	0.0	0.0
220780.	10.	2.0	21.45	7.84	0.0	0.0	0.0	0.0	990.	0.0	0.0	0.0
220780.	10.	3.0	21.40	7.80	0.0	0.0	0.0	0.0	1060.	0.0	0.0	0.0
220780.	10.	4.0	20.35	7.79	0.0	0.0	0.0	0.0	1120.	0.0	0.0	0.0
220780.	10.	5.0	20.30	7.89	0.0	0.0	0.0	0.0	1200.	0.0	0.0	0.0
220780.	10.	6.0	18.30	7.92	0.0	0.0	0.0	0.0	1240.	0.0	0.0	0.0
220780.	10.	7.0	15.40	7.95	0.0	0.0	0.0	0.0	1280.	0.0	0.0	0.0
220780.	10.	8.0	13.80	7.91	0.0	0.0	0.0	0.0	1320.	0.0	0.0	0.0
220780.	10.	9.0	13.05	7.94	0.0	0.0	0.0	0.0	1330.	0.0	0.0	0.0
220780.	10.	10.0	11.90	7.96	0.0	0.0	0.0	0.0	1340.	0.0	0.0	0.0
220780.	10.	11.0	11.45	7.76	0.0	0.0	0.0	0.0	1350.	0.0	0.0	0.0
220780.	11.	0.0	22.05	7.84	0.0	0.0	0.0	0.0	400.	0.0	0.0	0.0
220780.	11.	1.0	22.05	7.76	0.0	0.0	0.0	0.0	820.	0.0	0.0	0.0
220780.	11.	2.0	22.05	7.72	0.0	0.0	0.0	0.0	1060.	0.0	0.0	0.0
220780.	11.	3.0	21.95	7.72	0.0	0.0	0.0	0.0	1130.	0.0	0.0	0.0
220780.	11.	4.0	21.05	7.69	0.0	0.0	0.0	0.0	1230.	0.0	0.0	0.0
220780.	11.	5.0	20.40	7.69	0.0	0.0	0.0	0.0	1300.	0.0	0.0	0.0

DATE	STAT	DEPTH	BITUMEN	TSOLIDS	SPMGRAV	NA	K	CA	MG	FE	MN	AL
220780.	1.	0.0	305.0	0.73	0.58	280.10	15.16	7.24	5.02	2.2000	0.0544	7.8740
220780.	1.	1.0	287.3	0.73	0.59	277.40	15.04	7.20	5.03	2.2620	0.0554	8.1470
220780.	1.	2.0	293.4	0.73	0.63	275.80	13.94	7.03	4.97	2.4820	0.0530	8.9670
220780.	1.	3.0	316.9	0.74	0.63	282.30	12.97	6.86	5.11	3.0570	0.0581	11.0600
220780.	1.	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
220780.	1.	5.0	311.2	0.75	0.62	273.10	11.04	6.65	4.97	2.8710	0.0542	10.3100
220780.	1.	6.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
220780.	1.	7.0	444.9	0.89	0.75	279.00	11.01	7.67	5.30	2.4230	0.0558	8.5260
220780.	1.	8.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
220780.	1.	9.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
220780.	1.	10.0	1581.1	2.75	2.56	387.30	32.44	5.13	6.35	10.0400	0.0879	35.7600
220780.	1.	11.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
220780.	1.	12.0	2196.2	3.68	3.50	276.30	31.99	4.51	6.29	11.3900	0.0878	39.4700
220780.	1.	15.0	12372.1	11.81	11.13	285.90	37.38	4.87	6.06	9.5610	0.0730	32.5900
220780.	2.	0.0	287.1	0.73	0.58	290.70	22.69	6.86	5.00	2.4620	0.0469	8.4190
220780.	2.	1.0	272.7	0.73	0.60	284.00	20.72	6.61	4.69	1.9640	0.0466	6.8150
220780.	2.	2.0	291.5	0.73	0.60	285.50	19.78	7.01	4.90	1.8780	0.0486	6.5960
220780.	2.	3.0	299.8	0.73	0.61	279.30	19.44	6.54	4.58	2.1860	0.0	7.6930
220780.	2.	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
220780.	2.	5.0	288.0	0.73	0.61	276.80	17.99	6.75	4.75	2.0250	0.1198	7.106
220780.	2.	6.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
220780.	2.	7.0	468.8	1.06	0.91	283.70	20.95	5.06	4.57	4.5440	0.0	15.7600
220780.	2.	8.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
220780.	2.	9.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
220780.	2.	10.0	1454.1	2.53	2.36	283.30	30.66	5.06	5.60	7.9340	0.0733	27.1300
220780.	2.	11.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
220780.	2.	12.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
220780.	2.	13.0	1869.0	3.65	3.46	264.70	36.01	4.73	6.00	11.5300	0.0876	37.9400
220780.	2.	14.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
220780.	2.	15.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
220780.	2.	16.0	16278.0	22.35	20.66	201.00	35.84	5.05	7.37	18.6500	0.1239	53.4500
220780.	3.	0.0	318.2	0.74	0.63	281.90	22.31	6.43	4.61	2.6380	0.0517	9.3540
220780.	3.	1.0	282.2	0.75	0.63	290.70	22.34	6.79	4.96	2.8960	0.1265	10.1300
220780.	3.	2.0	285.1	0.74	0.62	280.70	19.89	6.70	4.76	2.3650	0.0524	8.2420
220780.	3.	3.0	308.6	0.74	0.61	283.80	21.75	6.68	4.73	2.1170	0.0465	7.4690
220780.	3.	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
220780.	3.	5.0	206.1	0.74	0.61	281.80	21.34	6.82	4.88	2.1500	0.0474	7.5500
220780.	3.	6.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
220780.	3.	7.0	438.5	0.98	0.83	283.70	21.93	5.81	4.69	2.8570	0.0499	9.9860
220780.	3.	8.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
220780.	3.	9.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
220780.	3.	10.0	1337.6	2.39	2.19	270.20	29.48	4.84	5.32	7.6290	0.0617	26.3400
220780.	3.	11.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
220780.	3.	12.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
220780.	3.	13.0	2165.7	3.54	3.31	265.40	30.00	4.57	5.48	9.1620	0.0671	30.5700
220780.	4.	0.0	298.1	0.73	0.60	275.90	20.22	6.81	4.83	2.3990	0.0428	8.4280
220780.	4.	1.0	312.1	0.73	0.61	277.20	19.30	6.84	4.83	2.1580	0.0476	7.7170
220780.	4.	2.0	277.2	0.72	0.57	276.60	20.26	6.73	4.76	2.4700	0.0486	8.7980
220780.	4.	3.0	299.4	0.72	0.60	274.20	20.03	6.49	4.57	2.2490	0.0453	7.8800
220780.	4.	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
220780.	4.	5.0	266.1	0.72	0.58	280.70	21.27	6.63	4.74	2.4160	0.0434	8.6410
220780.	5.	0.0	281.2	0.73	0.62	276.80	20.59	6.30	4.59	2.2430	0.0454	7.8620
220780.	5.	1.0	249.0	0.74	0.60	276.80	15.78	6.06	4.44	2.5090	0.0465	8.7880
220780.	5.	2.0	304.8	0.74	0.61	285.50	22.13	6.01	4.47	2.7640	0.0430	9.7300
220780.	5.	3.0	287.2	0.74	0.59	284.50	23.35	6.22	4.93	4.0140	0.0541	15.8800
220780.	5.	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
220780.	5.	5.0	231.0	0.74	0.58	282.80	19.22	6.55	4.92	3.1180	0.0518	11.6700
220780.	5.	6.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

220780.	5.	7.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
220780.	6.	0.0	223.0	0.76	0.64	276.80	18.46	6.64	4.88	2.5940	0.0537	8.9930
220780.	6.	1.0	211.9	0.75	0.62	277.30	17.64	6.90	4.95	2.2020	0.0530	7.5300
220780.	6.	2.0	286.3	0.75	0.62	280.80	17.75	7.13	5.19	2.6060	0.0560	8.9870
220780.	6.	3.0	288.2	0.76	0.64	278.60	14.35	7.15	5.03	1.9290	0.0494	6.5260
220780.	6.	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
220780.	6.	5.0	186.6	0.76	0.62	285.40	15.64	7.21	5.36	3.4620	0.0593	12.1900
220780.	6.	6.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
220780.	6.	7.0	215.1	0.77	0.65	279.90	14.37	7.51	5.47	2.8070	0.0579	9.8450
220780.	6.	8.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
220780.	6.	9.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
220780.	6.	10.0	981.1	1.93	1.77	285.90	18.30	5.57	5.72	7.3530	0.1198	25.6300
220780.	6.	11.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
220780.	6.	12.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
220780.	6.	13.0	810.3	3.25	3.02	272.00	22.06	4.94	6.37	12.2400	0.0927	40.7000
220780.	6.	14.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
220780.	6.	15.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
220780.	6.	16.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
220780.	6.	21.0	48411.0	38.53	36.85	204.00	14.74	5.23	4.67	8.2930	0.0696	22.8700
220780.	7.	0.0	199.3	0.76	0.62	287.50	12.04	6.82	4.88	2.4040	0.0474	8.0920
220780.	7.	1.0	205.9	0.75	0.62	280.50	11.56	6.48	4.67	2.3200	0.0480	7.9110
220780.	7.	2.0	223.6	0.74	0.62	283.90	11.77	6.27	4.51	2.5430	0.0491	8.5830
220780.	7.	3.0	306.5	0.75	0.61	283.10	16.14	6.16	4.48	2.6520	0.0452	9.3090
220780.	7.	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
220780.	7.	5.0	306.2	0.75	0.61	284.20	14.15	6.16	4.52	2.9880	0.0488	10.3500
220780.	7.	6.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
220780.	7.	7.0	264.5	0.93	0.79	284.80	15.77	6.10	5.05	4.5790	0.0589	18.0700
220780.	8.	0.0	290.0	0.76	0.62	289.60	14.45	6.26	4.59	3.2850	0.0483	11.1300
220780.	8.	1.0	198.8	0.76	0.59	284.60	13.69	6.22	4.45	2.8530	0.0480	9.8300
220780.	8.	2.0	211.0	0.76	0.63	282.10	13.27	6.28	4.50	2.8710	0.0500	9.8300
220780.	8.	3.0	318.8	0.75	0.61	281.10	17.37	6.41	4.65	3.0830	0.0506	10.8200
220780.	9.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
220780.	9.	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
220780.	9.	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
220780.	9.	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
220780.	9.	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
220780.	9.	5.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
220780.	10.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
220780.	10.	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
220780.	10.	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
220780.	10.	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
220780.	10.	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
220780.	10.	5.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
220780.	10.	6.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
220780.	10.	7.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
220780.	10.	8.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
220780.	10.	9.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
220780.	10.	10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
220780.	10.	11.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
220780.	11.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
220780.	11.	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
220780.	11.	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
220780.	11.	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
220780.	11.	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
220780.	11.	5.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

DATE	STAT	DEPTH	V	TI	CO	MO	CD	ZN	B	BA	PB
220780.	1.	0.0	0.0101	0.1011	0.0075	0.1179	0.0190	0.0018	1.1980	0.0797	0.0280
220780.	1.	1.0	0.0077	0.1142	0.0100	0.0468	0.0190	0.0033	1.0340	0.0813	0.0290
220780.	1.	2.0	0.0069	0.1162	0.0083	0.0357	0.0210	0.0	0.9766	0.0790	0.0310
220780.	1.	3.0	0.0091	0.1364	0.0169	0.0542	0.0260	0.0046	1.1880	0.0786	0.0360
220780.	1.	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0210
220780.	1.	5.0	0.0129	0.1464	0.0138	0.0425	0.0250	0.0	0.9728	0.0749	0.0
220780.	1.	6.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
220780.	1.	7.0	0.0085	0.1210	0.0113	0.0419	0.0210	0.0	0.9877	0.0795	0.0280
220780.	1.	8.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
220780.	1.	9.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
220780.	1.	10.0	0.0528	0.3234	0.0343	0.1308	0.0380	0.0135	1.1360	0.0971	0.0600
220780.	1.	11.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
220780.	1.	12.0	0.0583	0.3419	0.0416	0.0900	0.0360	0.0156	1.0240	0.1016	0.0550
220780.	1.	15.0	0.0476	0.1551	0.0304	0.0767	0.0450	0.0143	1.0400	0.0818	0.0540
220780.	2.	0.0	0.0169	0.2143	0.0095	0.0506	0.0210	0.0	0.9520	0.1678	0.0300
220780.	2.	1.0	0.0127	0.0850	0.0084	0.0364	0.0170	0.0	0.9261	0.0750	0.0240
220780.	2.	2.0	0.0110	0.0716	0.0044	0.0440	0.0160	0.0	0.9225	0.0748	0.0230
220780.	2.	3.0	0.0132	0.1164	0.0	0.2243	0.0190	0.0	1.1300	0.0665	0.0270
220780.	2.	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
220780.	2.	5.0	0.0116	0.0910	0.0	0.0445	0.0170	0.0	0.9978	0.0759	0.0250
220780.	2.	6.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
220780.	2.	7.0	0.0253	0.2168	0.0	0.0578	0.0450	0.0	1.0470	0.0870	0.0550
220780.	2.	8.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
220780.	2.	9.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
220780.	2.	10.0	0.0443	0.2431	0.0594	0.2124	0.0290	0.0076	1.1470	0.0564	0.0460
220780.	2.	11.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
220780.	2.	12.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
220780.	2.	13.0	0.0582	0.2856	0.0831	0.0781	0.0430	0.0129	0.9831	0.0736	0.0630
220780.	2.	14.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
220780.	2.	15.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
220780.	2.	16.0	0.0923	0.2885	0.1486	0.0888	0.0480	0.0324	0.9287	0.0905	0.0730
220780.	3.	0.0	0.0108	0.1337	0.0166	0.0445	0.0230	0.0016	0.9516	0.0544	0.0330
220780.	3.	1.0	0.0114	0.1269	0.0877	0.0446	0.0180	0.0721	0.9540	0.0457	0.0112
220780.	3.	2.0	0.0070	0.1467	0.0155	0.0410	0.0220	0.0004	0.9112	0.0543	0.0290
220780.	3.	3.0	0.0167	0.1333	0.0148	0.0	0.0190	0.0	0.7880	0.0640	0.0260
220780.	3.	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
220780.	3.	5.0	0.0120	0.1303	0.0154	0.0	0.0180	0.0	0.7765	0.0783	0.0250
220780.	3.	6.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
220780.	3.	7.0	0.0175	0.1615	0.0210	0.0	0.0250	0.0	0.8049	0.0789	0.0260
220780.	3.	8.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
220780.	3.	9.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
220780.	3.	10.0	0.0405	0.3440	0.0670	0.1765	0.0520	0.0016	1.0770	0.0821	0.0670
220780.	3.	11.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
220780.	3.	12.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
220780.	3.	13.0	0.0445	0.2370	0.0842	0.0685	0.0500	0.0038	0.9669	0.0906	0.0670
220780.	4.	0.0	0.0107	0.1105	0.0140	0.0462	0.0210	0.0	0.9752	0.0834	0.0300
220780.	4.	1.0	0.0120	0.1023	0.0197	0.2014	0.0190	0.0	1.1090	0.0424	0.0270
220780.	4.	2.0	0.0124	0.1207	0.0252	0.0444	0.0210	0.0	0.9960	0.0506	0.0310
220780.	4.	3.0	0.0116	0.0961	0.0221	0.0379	0.0200	0.0	0.9637	0.0525	0.0250
220780.	4.	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
220780.	4.	5.0	0.0163	0.1032	0.0266	0.0425	0.0210	0.0	0.8875	0.0623	0.0300
220780.	5.	0.0	0.0131	0.1101	0.0246	0.0452	0.0200	0.0	0.8744	0.0732	0.0280
220780.	5.	1.0	0.0145	0.1199	0.0239	0.0491	0.0220	0.0007	0.8916	0.0742	0.0310
220780.	5.	2.0	0.0193	0.1518	0.0308	0.0	0.0240	0.0	0.8164	0.0593	0.0310
220780.	5.	3.0	0.0244	0.3884	0.0440	0.0	0.0350	0.0	0.8085	0.0842	0.0510
220780.	5.	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
220780.	5.	5.0	0.0189	0.2197	0.0355	0.0	0.0270	0.0	0.7755	0.0782	0.0410
220780.	5.	6.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

220780.	5.	7.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
220780.	6.	0.0	0.0320	0.1275	0.0190	0.1960	0.0377	0.0028	1.1040	0.0764	0.0507
220780.	6.	1.0	0.0266	0.1072	0.0158	0.0569	0.0342	0.0085	1.0040	0.0768	0.0499
220780.	6.	2.0	0.0308	0.1267	0.0206	0.0516	0.0403	0.0025	1.0050	0.0798	0.0695
220780.	6.	3.0	0.0185	0.0993	0.0052	0.1647	0.0130	0.0003	1.0240	0.0668	0.0180
220780.	6.	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
220780.	6.	5.0	0.0267	0.1473	0.0089	0.0633	0.0190	0.0025	0.9949	0.0833	0.0160
220780.	6.	6.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
220780.	6.	7.0	0.0234	0.1318	0.0076	0.0667	0.0110	0.0022	0.9420	0.0813	0.0120
220780.	6.	8.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
220780.	6.	9.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
220780.	6.	10.0	0.0537	0.2764	0.0635	0.0918	0.0392	0.0591	0.9976	0.0881	0.0344
220780.	6.	11.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
220780.	6.	12.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
220780.	6.	13.0	0.0815	0.3260	0.0259	0.1107	0.0110	0.0201	0.9897	0.1073	0.0190
220780.	6.	14.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
220780.	6.	15.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
220780.	6.	16.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
220780.	6.	21.0	0.0655	0.2246	0.0201	0.0913	0.0	0.0155	0.9606	0.0791	0.0
220780.	7.	0.0	0.0227	0.2178	0.0101	0.0785	0.0	0.0020	0.9629	0.1423	0.0059
220780.	7.	1.0	0.0250	0.1388	0.0125	0.0731	0.0034	0.0028	0.9281	0.0815	0.0166
220780.	7.	2.0	0.0274	0.1263	0.0129	0.0748	0.0046	0.0038	0.9589	0.0787	0.0208
220780.	7.	3.0	0.0142	0.1161	0.0024	0.1191	0.0230	0.0	1.0600	0.0687	0.0330
220780.	7.	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
220780.	7.	5.0	0.0143	0.1343	0.0	0.0324	0.0260	0.0	0.9896	0.0787	0.0360
220780.	7.	6.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
220780.	7.	7.0	0.0247	0.4106	0.0049	0.0406	0.0400	0.0045	1.0000	0.0910	0.0590
220780.	8.	0.0	0.0172	0.2103	0.0029	0.0335	0.0280	0.0	0.9921	0.1312	0.0390
220780.	8.	1.0	0.0144	0.1634	0.0013	0.0350	0.0250	0.0	0.9646	0.0845	0.0340
220780.	8.	2.0	0.0149	0.1615	0.0015	0.0421	0.0250	0.0007	0.9495	0.0837	0.0340
220780.	8.	3.0	0.0182	0.1652	0.0078	0.1978	0.0270	0.0084	1.1100	0.0764	0.0380
220780.	9.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
220780.	9.	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
220780.	9.	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
220780.	9.	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
220780.	9.	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
220780.	9.	5.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
220780.	10.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
220780.	10.	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
220780.	10.	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
220780.	10.	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
220780.	10.	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
220780.	10.	5.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
220780.	10.	6.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
220780.	10.	7.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
220780.	10.	8.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
220780.	10.	9.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
220780.	10.	10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
220780.	10.	11.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
220780.	11.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
220780.	11.	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
220780.	11.	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
220780.	11.	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
220780.	11.	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
220780.	11.	5.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

DATE	STAT	DEPTH	TEMP	PH	CHLOR	SULPH	BICARB	TOC	CONDUCT	NITRITE	NITRATE	PO4
250880.	1.	0.0	16.00	7.92	78.00	195.00	463.00	42.00	1420.	0.004	0.008	0.040
250880.	1.	1.0	16.05	7.93	79.00	195.00	463.00	44.00	1430.	0.004	0.008	0.080
250880.	1.	2.0	16.10	7.92	0.0	0.0	0.0	0.0	1430.	0.0	0.0	0.0
250880.	1.	3.0	16.25	7.93	72.00	213.00	450.00	44.00	1430.	0.005	0.007	0.050
250880.	1.	4.0	16.35	7.93	0.0	0.0	0.0	0.0	1420.	0.0	0.0	0.0
250880.	1.	5.0	16.40	7.97	78.00	200.00	468.00	44.00	1420.	0.006	0.010	0.040
250880.	1.	6.0	19.00	8.02	0.0	0.0	0.0	0.0	1440.	0.0	0.0	0.0
250880.	1.	7.0	17.65	7.95	79.00	188.00	463.00	45.00	1340.	0.006	0.009	0.045
250880.	1.	8.0	15.20	8.04	0.0	0.0	0.0	0.0	1280.	0.0	0.0	0.0
250880.	1.	9.0	14.95	8.11	73.00	120.00	498.00	46.00	1270.	0.018	0.006	0.120
250880.	1.	10.0	14.45	8.17	0.0	0.0	0.0	0.0	1270.	0.0	0.0	0.0
250880.	1.	11.0	14.70	8.17	70.00	115.00	498.00	45.00	1270.	0.018	0.005	0.130
250880.	2.	0.0	16.20	8.04	78.00	185.00	473.00	44.00	1430.	0.005	0.009	0.090
250880.	2.	1.0	16.25	8.03	79.00	185.00	468.00	45.00	1430.	0.010	0.007	0.040
250880.	2.	2.0	16.30	8.02	0.0	0.0	0.0	0.0	1430.	0.0	0.0	0.0
250880.	2.	3.0	16.30	8.03	78.00	185.00	473.00	44.50	1420.	0.009	0.010	0.055
250880.	2.	4.0	16.30	8.03	0.0	0.0	0.0	0.0	1410.	0.0	0.0	0.0
250880.	2.	5.0	16.35	8.04	78.00	185.00	463.00	45.00	1410.	0.011	0.004	0.050
250880.	2.	6.0	18.90	8.10	0.0	0.0	0.0	0.0	1420.	0.0	0.0	0.0
250880.	2.	7.0	16.85	7.92	76.00	185.00	450.00	44.00	1330.	0.008	0.008	0.055
250880.	2.	8.0	14.80	8.04	0.0	0.0	0.0	0.0	1270.	0.0	0.0	0.0
250880.	2.	9.0	14.05	8.14	72.00	160.00	501.00	46.00	1240.	0.015	0.004	0.110
250880.	2.	10.0	13.90	8.17	0.0	0.0	0.0	0.0	1250.	0.0	0.0	0.0
250880.	3.	0.0	16.50	8.06	77.00	180.00	480.00	45.00	1420.	0.010	0.008	0.050
250880.	3.	1.0	16.50	8.07	76.00	180.00	473.00	45.00	1420.	0.012	0.005	0.070
250880.	3.	2.0	16.50	8.07	0.0	0.0	0.0	0.0	1410.	0.0	0.0	0.0
250880.	3.	3.0	16.60	8.06	74.00	195.00	480.00	45.00	1420.	0.011	0.011	0.040
250880.	3.	4.0	16.60	8.06	0.0	0.0	0.0	0.0	1410.	0.0	0.0	0.0
250880.	3.	5.0	16.65	8.09	77.00	195.00	478.00	44.00	1410.	0.005	0.014	0.030
250880.	3.	6.0	19.20	8.08	0.0	0.0	0.0	0.0	1440.	0.0	0.0	0.0
250880.	3.	7.0	16.05	8.01	72.00	150.00	493.00	44.00	1320.	0.009	0.008	0.060
250880.	3.	8.0	14.75	8.08	0.0	0.0	0.0	0.0	1280.	0.0	0.0	0.0
250880.	3.	9.0	13.55	8.12	71.00	125.00	508.00	43.50	1230.	0.016	0.009	0.080
250880.	3.	10.0	13.50	8.16	0.0	0.0	0.0	0.0	1240.	0.0	0.0	0.0
250880.	3.	11.0	13.40	8.18	69.00	105.00	513.00	47.00	1230.	0.023	0.004	0.140
250880.	3.	12.0	12.65	8.20	0.0	0.0	0.0	0.0	1230.	0.0	0.0	0.0
250880.	3.	13.0	11.15	8.22	67.00	95.00	508.00	47.00	1190.	0.006	0.026	0.140
250880.	3.	14.0	10.40	8.37	0.0	0.0	0.0	0.0	1100.	0.0	0.0	0.0
250880.	3.	15.0	10.30	8.38	62.00	25.00	524.00	65.00	1090.	0.063	0.0	0.500
250880.	3.	16.0	10.35	8.41	0.0	0.0	0.0	0.0	1090.	0.0	0.0	0.0
250880.	4.	0.0	16.50	7.91	77.00	175.00	480.00	45.00	1430.	0.011	0.015	0.050
250880.	4.	1.0	16.50	7.91	77.00	190.00	468.00	42.00	1420.	0.010	0.010	0.055
250880.	4.	2.0	16.50	7.93	0.0	0.0	0.0	0.0	1420.	0.0	0.0	0.0
250880.	4.	3.0	16.50	7.94	81.00	125.00	475.00	43.00	1420.	0.012	0.008	0.045
250880.	4.	4.0	16.50	7.96	0.0	0.0	0.0	0.0	1420.	0.0	0.0	0.0
250880.	4.	5.0	17.65	7.95	79.00	190.00	473.00	43.00	1440.	0.010	0.009	0.050
250880.	4.	6.0	18.65	7.97	0.0	0.0	0.0	0.0	1450.	0.0	0.0	0.0
250880.	4.	7.0	17.25	7.86	79.00	195.00	478.00	44.00	1340.	0.015	0.009	0.060
250880.	4.	8.0	14.40	8.01	0.0	0.0	0.0	0.0	1260.	0.0	0.0	0.0
250880.	4.	9.0	14.00	8.09	73.00	145.00	493.00	43.00	1250.	0.023	0.005	0.100
250880.	4.	10.0	13.75	8.14	0.0	0.0	0.0	0.0	1240.	0.0	0.0	0.0
250880.	4.	11.0	13.75	8.15	66.00	119.00	493.00	46.00	1250.	0.032	0.006	0.210
250880.	4.	12.0	14.45	8.11	0.0	0.0	0.0	0.0	1240.	0.0	0.0	0.0
250880.	4.	13.0	15.00	8.08	67.00	110.00	519.00	47.00	1240.	0.031	0.008	0.160
250880.	4.	14.0	14.70	8.03	0.0	0.0	0.0	0.0	1230.	0.0	0.0	0.0
250880.	4.	15.0	11.85	8.16	71.00	95.00	508.00	57.00	1180.	0.038	0.005	0.265
250880.	5.	0.0	16.45	8.05	76.00	202.00	468.00	42.00	1430.	0.0611	0.008	0.040
250880.	5.	1.0	16.45	8.04	75.00	205.00	473.00	43.50	1430.	0.010	0.008	0.035

250880.	5.	2.0	16.40	8.02	0.0	0.0	0.0	0.0	1430.	0.0	0.0	0.0
250880.	5.	3.0	16.40	8.01	79.00	210.00	473.00	44.50	1430.	0.012	0.001	0.040
250880.	5.	4.0	16.50	8.06	0.0	0.0	0.0	0.0	1430.	0.0	0.0	0.0
250880.	5.	5.0	17.80	8.03	77.00	200.00	468.00	46.00	1460.	0.012	0.005	0.060
250880.	5.	6.0	19.10	8.06	0.0	0.0	0.0	0.0	1470.	0.0	0.0	0.0
250880.	5.	7.0	17.90	7.89	73.00	210.00	468.00	45.00	1370.	0.011	0.007	0.060
250880.	5.	8.0	15.45	7.98	0.0	0.0	0.0	0.0	1290.	0.0	0.0	0.0
250880.	5.	9.0	15.00	8.08	76.00	185.00	488.00	44.50	1270.	0.012	0.007	0.065
250880.	5.	10.0	14.05	8.16	0.0	0.0	0.0	0.0	1250.	0.0	0.0	0.0
250880.	5.	11.0	14.25	8.16	69.00	125.00	508.00	48.50	1250.	0.012	0.006	0.095
250880.	5.	12.0	14.80	8.16	0.0	0.0	0.0	0.0	1240.	0.0	0.0	0.0
250880.	6.	0.0	16.85	8.01	75.00	205.00	468.00	45.50	1430.	0.011	0.007	0.080
250880.	6.	1.0	16.75	8.00	77.00	205.00	463.00	46.00	1430.	0.013	0.004	0.080
250880.	6.	2.0	16.65	7.99	0.0	0.0	0.0	0.0	1430.	0.0	0.0	0.0
250880.	6.	3.0	16.65	7.99	76.00	205.00	463.00	46.50	1430.	0.012	0.005	0.080
250880.	6.	4.0	18.35	7.94	0.0	0.0	0.0	0.0	1450.	0.0	0.0	0.0
250880.	6.	5.0	18.10	7.94	77.00	205.00	468.00	46.50	1450.	0.017	0.008	0.050
250880.	6.	6.0	19.15	7.97	0.0	0.0	0.0	0.0	1450.	0.0	0.0	0.0
250880.	6.	7.0	17.95	7.92	77.00	210.00	473.00	47.00	1360.	0.013	0.005	0.090
250880.	6.	8.0	17.50	7.94	0.0	0.0	0.0	0.0	1340.	0.0	0.0	0.0
250880.	6.	9.0	15.80	8.02	74.00	160.00	483.00	48.00	1310.	0.018	0.004	0.090
250880.	6.	10.0	15.30	8.05	0.0	0.0	0.0	0.0	1290.	0.0	0.0	0.0
250880.	6.	11.0	15.65	8.07	69.00	133.00	488.00	50.50	1280.	0.026	0.003	0.155
250880.	6.	12.0	16.50	8.07	0.0	0.0	0.0	0.0	1270.	0.0	0.0	0.0
250880.	6.	13.0	14.90	8.12	68.00	130.00	488.00	49.50	1250.	0.022	0.006	0.125
250880.	6.	14.0	13.95	8.15	0.0	0.0	0.0	0.0	1190.	0.0	0.0	0.0
250880.	6.	15.0	13.85	8.18	68.00	125.00	496.00	49.00	1150.	0.022	0.006	0.140
250880.	6.	16.0	13.20	8.17	0.0	0.0	0.0	0.0	1140.	0.0	0.0	0.0
250880.	7.	0.0	16.65	8.04	78.00	210.00	460.00	47.00	1430.	0.014	0.005	0.070
250880.	7.	1.0	16.65	8.06	77.00	210.00	460.00	46.50	1430.	0.016	0.007	0.050
250880.	7.	2.0	16.65	8.05	0.0	0.0	0.0	0.0	1430.	0.0	0.0	0.0
250880.	7.	3.0	16.60	8.06	76.00	215.00	463.00	46.50	1430.	0.015	0.005	0.040
250880.	7.	4.0	16.60	8.05	0.0	0.0	0.0	0.0	1440.	0.0	0.0	0.0
250880.	7.	5.0	16.35	8.08	0.0	0.0	0.0	0.0	1440.	0.0	0.0	0.0
250880.	7.	6.0	17.70	8.12	76.00	215.00	473.00	47.00	1460.	0.019	0.003	0.050
250880.	7.	7.0	17.35	7.91	0.0	0.0	0.0	0.0	1370.	0.0	0.0	0.0
250880.	8.	0.0	16.60	8.04	0.0	0.0	0.0	0.0	1440.	0.0	0.0	0.0
250880.	8.	1.0	16.45	8.04	0.0	0.0	0.0	0.0	1430.	0.0	0.0	0.0
250880.	8.	2.0	16.25	8.04	0.0	0.0	0.0	0.0	1430.	0.0	0.0	0.0
250880.	8.	3.0	16.15	8.04	0.0	0.0	0.0	0.0	1430.	0.0	0.0	0.0
250880.	9.	0.0	16.80	7.97	0.0	0.0	0.0	0.0	1440.	0.0	0.0	0.0
250880.	9.	1.0	16.80	7.99	0.0	0.0	0.0	0.0	1430.	0.0	0.0	0.0
250880.	9.	2.0	16.50	7.98	0.0	0.0	0.0	0.0	1430.	0.0	0.0	0.0
250880.	9.	3.0	16.30	7.97	0.0	0.0	0.0	0.0	1430.	0.0	0.0	0.0
250880.	9.	4.0	15.65	7.99	0.0	0.0	0.0	0.0	1430.	0.0	0.0	0.0
250880.	10.	0.0	16.65	8.04	0.0	0.0	0.0	0.0	1450.	0.0	0.0	0.0
250880.	10.	1.0	16.50	8.02	0.0	0.0	0.0	0.0	1440.	0.0	0.0	0.0
250880.	10.	2.0	16.50	8.02	0.0	0.0	0.0	0.0	1440.	0.0	0.0	0.0
250880.	10.	3.0	15.90	7.99	0.0	0.0	0.0	0.0	1430.	0.0	0.0	0.0
250880.	11.	0.0	17.45	8.01	76.00	220.00	468.00	47.00	1450.	0.015	0.005	0.045
250880.	11.	1.0	17.25	7.97	76.00	222.00	473.00	47.00	1440.	0.019	0.006	0.050
250880.	11.	2.0	16.80	7.97	0.0	0.0	0.0	0.0	1440.	0.0	0.0	0.0
250880.	11.	3.0	16.50	7.98	74.00	225.00	468.00	47.00	1440.	0.016	0.010	0.065
250880.	11.	4.0	16.38	8.01	0.0	0.0	0.0	0.0	1430.	0.0	0.0	0.0
250880.	11.	5.0	16.10	7.98	76.00	220.00	463.00	46.50	1430.	0.018	0.007	0.080

DATE	STAT	DEPTH	BITUMEN	TSOLIDS	SPMGRAV	NA	K	CA	MG	FE	MN	AL
250880.	1.	0.0	169.7	0.56	0.43	285.70	22.09	7.79	5.32	1.7160	0.0937	6.6260
250880.	1.	1.0	179.8	0.61	0.43	284.30	22.01	7.79	5.27	1.7370	0.0497	6.6430
250880.	1.	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
250880.	1.	3.0	175.2	0.56	0.44	282.80	21.79	7.66	5.14	1.7090	0.0486	6.5870
250880.	1.	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
250880.	1.	5.0	177.8	0.59	0.47	291.00	22.75	6.95	5.05	1.9920	0.0474	7.5710
250880.	1.	6.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
250880.	1.	7.0	136.3	0.60	0.46	288.10	22.24	6.70	4.93	2.0240	0.0482	7.6480
250880.	1.	8.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
250880.	1.	9.0	1872.0	3.40	2.98	272.90	30.57	5.21	6.19	9.0920	0.0747	32.9600
250880.	1.	10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
250880.	1.	11.0	2117.0	3.63	3.41	283.10	33.07	5.08	6.46	9.8690	0.1339	36.0600
250880.	2.	0.0	141.6	0.60	0.49	296.10	21.16	6.51	4.47	0.9212	0.0461	3.7080
250880.	2.	1.0	190.8	0.60	0.47	291.90	22.66	6.18	4.79	2.2380	0.0503	8.6570
250880.	2.	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
250880.	2.	3.0	192.4	0.60	0.45	288.30	22.91	6.17	4.75	2.5140	0.0519	9.5950
250880.	2.	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
250880.	2.	5.0	200.4	0.59	0.46	286.20	22.40	6.20	4.71	2.4540	0.0510	9.3870
250880.	2.	6.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
250880.	2.	7.0	191.6	0.61	0.48	288.80	22.23	6.30	4.66	2.1880	0.0506	8.5040
250880.	2.	8.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
250880.	2.	9.0	1539.5	1.93	2.03	285.20	26.93	5.79	5.89	6.7160	0.0675	25.2800
250880.	2.	10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
250880.	3.	0.0	135.5	0.59	0.47	294.10	22.93	6.25	4.80	2.5490	0.0501	9.9630
250880.	3.	1.0	196.0	0.59	0.48	288.60	22.38	6.13	4.69	2.5530	0.0490	9.8130
250880.	3.	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
250880.	3.	3.0	196.6	0.59	0.47	299.60	23.33	6.27	4.97	2.7970	0.0779	10.7200
250880.	3.	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
250880.	3.	5.0	120.1	0.61	0.49	289.90	20.85	6.32	4.74	1.7900	0.0507	6.7000
250880.	3.	6.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
250880.	3.	7.0	112.8	0.60	0.48	290.20	21.86	5.95	4.53	2.1670	0.0465	8.1060
250880.	3.	8.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
250880.	3.	9.0	349.1	1.79	1.57	281.70	27.21	5.22	5.23	6.2370	0.0600	22.8700
250880.	3.	10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
250880.	3.	11.0	1807.0	3.51	3.23	269.20	32.59	3.89	5.88	10.7300	0.0731	37.3200
250880.	3.	12.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
250880.	3.	13.0	687.9	3.71	3.27	267.90	33.58	4.21	6.08	11.0800	0.0774	38.7900
250880.	3.	14.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
250880.	3.	15.0	3204.0	13.46	12.82	250.50	44.59	3.65	8.36	21.5100	0.1451	65.8500
250880.	3.	16.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
250880.	4.	0.0	132.2	0.59	0.47	293.40	24.02	6.05	4.51	2.4630	0.0426	9.1480
250880.	4.	1.0	134.1	0.59	0.46	290.70	22.77	6.09	4.54	2.1800	0.0418	8.1700
250880.	4.	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
250880.	4.	3.0	236.5	0.60	0.48	297.50	24.17	6.08	4.47	2.2230	0.0388	8.1290
250880.	4.	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
250880.	4.	5.0	224.2	0.60	0.47	294.90	23.78	6.34	4.70	2.1580	0.0435	7.9210
250880.	4.	6.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
250880.	4.	7.0	276.9	0.79	0.64	300.40	25.84	5.15	4.44	3.1410	0.0426	11.7100
250880.	4.	8.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
250880.	4.	9.0	1065.1	2.04	1.87	283.80	28.21	5.07	5.18	6.0640	0.0581	22.4100
250880.	4.	10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
250880.	4.	11.0	1982.3	3.57	3.37	271.90	34.83	4.32	5.98	10.7500	0.0776	38.0200
250880.	4.	12.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
250880.	4.	13.0	2200.3	3.75	3.55	270.80	35.84	4.47	6.12	11.3700	0.0820	39.8800
250880.	4.	14.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
250880.	4.	15.0	2319.4	9.85	9.44	294.90	46.15	4.28	8.15	18.1000	0.1050	63.9300
250880.	5.	0.0	144.2	0.60	0.45	300.30	23.09	6.26	4.41	1.7790	0.0404	6.5820
250880.	5.	1.0	200.7	0.60	0.48	299.70	22.16	6.33	4.05	0.9899	0.0360	3.7470

250880.	5.	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
250880.	5.	3.0	201.5	0.60	0.48	306.50	24.46	6.18	4.40	1.9680	0.0674	7.3340
250880.	5.	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
250880.	5.	5.0	195.5	0.60	0.46	297.70	23.86	5.95	4.31	2.1950	0.0440	8.0860
250880.	5.	6.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
250880.	5.	7.0	205.6	0.60	0.46	300.60	23.97	6.09	4.32	2.1830	0.0425	8.0540
250880.	5.	8.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
250880.	5.	9.0	619.1	1.44	1.31	308.40	24.22	5.51	4.19	2.1940	0.0354	8.2760
250880.	5.	10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
250880.	5.	11.0	1848.2	3.48	3.35	287.00	22.29	4.77	3.46	2.0540	0.0277	7.7300
250880.	5.	12.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
250880.	6.	0.0	213.2	0.61	0.48	299.40	22.90	6.19	4.22	1.6430	0.0406	6.0520
250880.	6.	1.0	197.2	0.62	0.46	303.20	24.63	5.97	4.38	2.4060	0.0397	8.9820
250880.	6.	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
250880.	6.	3.0	205.6	0.61	0.44	302.60	24.51	5.96	4.28	2.3220	0.0395	8.4950
250880.	6.	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
250880.	6.	5.0	149.7	0.60	0.46	301.00	23.37	5.82	4.10	1.7940	0.0372	6.6600
250880.	6.	6.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
250880.	6.	7.0	270.1	0.80	0.63	314.70	26.24	5.05	4.08	2.8020	0.0370	10.3600
250880.	6.	8.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
250880.	6.	9.0	913.4	2.04	1.89	298.00	28.40	4.81	4.87	6.0660	0.0537	22.4700
250880.	6.	10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
250880.	6.	11.0	1836.2	3.45	3.29	283.50	35.07	4.24	5.69	10.4700	0.0742	36.7200
250880.	6.	12.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
250880.	6.	13.0	2013.9	3.92	3.80	287.80	35.24	4.34	5.90	10.1600	0.2337	35.6900
250880.	6.	14.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
250880.	6.	15.0	2155.3	4.62	4.24	283.80	34.47	3.95	5.50	10.6800	0.0747	35.2400
250880.	6.	16.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
250880.	7.	0.0	157.9	0.60	0.47	297.40	24.06	5.83	4.34	2.3830	0.0405	8.9810
250880.	7.	1.0	210.1	0.61	0.45	303.10	24.29	5.75	4.13	1.9050	0.0347	6.8600
250880.	7.	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
250880.	7.	3.0	203.7	0.60	0.48	298.70	23.75	5.82	4.08	1.8090	0.0363	6.4070
250880.	7.	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
250880.	7.	5.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
250880.	7.	6.0	213.1	0.61	0.47	298.80	24.20	5.92	4.13	2.1200	0.0379	7.6140
250880.	7.	7.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
250880.	8.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
250880.	8.	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
250880.	8.	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
250880.	8.	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
250880.	9.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
250880.	9.	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
250880.	9.	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
250880.	9.	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
250880.	9.	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
250880.	10.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
250880.	10.	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
250880.	10.	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
250880.	10.	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
250880.	11.	0.0	198.6	0.57	0.44	280.40	23.14	7.11	4.48	1.6020	0.0384	5.7290
250880.	11.	1.0	200.4	0.57	0.45	283.40	24.01	6.99	4.49	1.9820	0.0406	7.0610
250880.	11.	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
250880.	11.	3.0	208.0	0.58	0.46	282.00	22.93	6.26	4.14	1.6920	0.0367	5.9880
250880.	11.	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
250880.	11.	5.0	211.5	0.58	0.39	292.40	24.74	5.63	4.19	1.9570	0.1343	6.9200

DATE	STAT	DEPTH	V	TI	CO	MO	CD	ZN	B	BA	PB
250880.	1.	0.0	0.0291	0.1518	0.0602	0.0836	0.0948	0.0469	0.7639	0.0669	0.0933
250880.	1.	1.0	0.0265	0.1436	0.0147	0.0748	0.0472	0.0040	0.6589	0.0766	0.0453
250880.	1.	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
250880.	1.	3.0	0.0260	0.1138	0.0139	0.0785	0.0399	0.0021	0.5957	0.0770	0.0431
250880.	1.	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
250880.	1.	5.0	0.0274	0.1363	0.0145	0.0827	0.0478	0.0028	0.6542	0.0837	0.0531
250880.	1.	6.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
250880.	1.	7.0	0.0283	0.1280	0.0149	0.0813	0.0507	0.0020	0.5667	0.0709	0.0509
250880.	1.	8.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
250880.	1.	9.0	0.0692	0.2998	0.0194	0.1178	0.0563	0.0139	0.4440	0.0882	0.0403
250880.	1.	10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
250880.	1.	11.0	0.0796	0.3614	0.0783	0.1292	0.1239	0.0696	0.6231	0.0861	0.1103
250880.	2.	0.0	0.0226	0.0986	0.0194	0.0783	0.0503	0.0045	0.5941	0.0759	0.0593
250880.	2.	1.0	0.0307	0.1531	0.0177	0.0850	0.0519	0.0045	0.5522	0.0720	0.0494
250880.	2.	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
250880.	2.	3.0	0.0335	0.1855	0.0202	0.1079	0.0614	0.0040	0.5209	0.0642	0.0592
250880.	2.	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
250880.	2.	5.0	0.0330	0.1758	0.0200	0.0904	0.0622	0.0039	0.4762	0.0621	0.0665
250880.	2.	6.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
250880.	2.	7.0	0.0322	0.1742	0.0206	0.0918	0.0639	0.0039	0.4737	0.0615	0.0675
250880.	2.	8.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
250880.	2.	9.0	0.0580	0.3293	0.0283	0.1087	0.0584	0.0103	0.3816	0.0843	0.0534
250880.	2.	10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
250880.	3.	0.0	0.0326	0.2069	0.0188	0.0967	0.0635	0.0048	0.4418	0.0662	0.0806
250880.	3.	1.0	0.0328	0.1926	0.0223	0.0943	0.0598	0.0040	0.3532	0.0677	0.0661
250880.	3.	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
250880.	3.	3.0	0.0328	0.1737	0.0502	0.0946	0.0850	0.0305	0.5072	0.0599	0.0889
250880.	3.	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
250880.	3.	5.0	0.0283	0.1337	0.0233	0.0871	0.0651	0.0067	0.3819	0.0672	0.0718
250880.	3.	6.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
250880.	3.	7.0	0.0321	0.1632	0.0207	0.0876	0.0600	0.0043	0.3481	0.0654	0.0734
250880.	3.	8.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
250880.	3.	9.0	0.0394	0.2828	0.0083	0.0783	0.0	0.0064	0.8243	0.0827	0.0420
250880.	3.	10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
250880.	3.	11.0	0.0632	0.3690	0.0185	0.0810	0.0	0.0155	0.7191	0.0876	0.0490
250880.	3.	12.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
250880.	3.	13.0	0.0659	0.3847	0.0189	0.0686	0.0	0.0139	0.6847	0.0925	0.0350
250880.	3.	14.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
250880.	3.	15.0	0.1208	0.3826	0.0566	0.1005	0.0	0.0576	0.9103	0.1054	0.0610
250880.	3.	16.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
250880.	4.	0.0	0.0138	0.2095	0.0010	0.0302	0.0210	0.0006	0.7844	0.0838	0.0320
250880.	4.	1.0	0.0114	0.1804	0.0007	0.0268	0.0190	0.0001	0.7826	0.0740	0.0290
250880.	4.	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
250880.	4.	3.0	0.0619	0.1486	0.0027	0.0363	0.0170	0.0	0.8440	0.0643	0.0280
250880.	4.	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
250880.	4.	5.0	0.0169	0.1580	0.0004	0.0353	0.0180	0.0001	0.8180	0.0742	0.0280
250880.	4.	6.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
250880.	4.	7.0	0.0189	0.1586	0.0069	0.0476	0.0190	0.0215	0.8336	0.0729	0.0350
250880.	4.	8.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
250880.	4.	9.0	0.0368	0.2557	0.0129	0.1442	0.0350	0.0074	0.6486	0.0786	0.0520
250880.	4.	10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
250880.	4.	11.0	0.0599	0.3140	0.0218	0.0760	0.0420	0.0527	0.4832	0.0910	0.0730
250880.	4.	12.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
250880.	4.	13.0	0.0596	0.3485	0.0201	0.0744	0.0570	0.0143	0.4612	0.0925	0.1000
250880.	4.	14.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
250880.	4.	15.0	0.0935	0.5085	0.0333	0.1037	0.0720	0.0252	0.6427	0.1638	0.1270
250880.	5.	0.0	0.0	0.1730	0.0100	0.0269	0.0150	0.0001	0.5434	0.0758	0.0230
250880.	5.	1.0	0.0	0.0978	0.0090	0.0219	0.0080	0.0001	0.5237	0.0731	0.0130

250880.	5.	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
250880.	5.	3.0	0.0	0.1247	0.0169	0.0221	0.0170	0.0213	0.5611	0.0676	0.0260
250880.	5.	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
250880.	5.	5.0	0.0012	0.1650	0.0050	0.0262	0.0190	0.0015	0.4894	0.0739	0.0280
250880.	5.	6.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
250880.	5.	7.0	0.0	0.1673	0.0120	0.0236	0.0190	0.0001	0.4724	0.0723	0.0280
250880.	5.	8.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
250880.	5.	9.0	0.0007	0.1856	0.0100	0.0268	0.0190	0.0001	0.5489	0.0886	0.0290
250880.	5.	10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
250880.	5.	11.0	0.0	0.1880	0.0090	0.0225	0.0180	0.0001	0.3779	0.0600	0.0270
250880.	5.	12.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
250880.	6.	0.0	0.0	0.2157	0.0130	0.0200	0.0140	0.0001	0.4524	0.0709	0.0210
250880.	6.	1.0	0.0	0.2358	0.0130	0.0233	0.0210	0.0001	0.4425	0.0663	0.0310
250880.	6.	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
250880.	6.	3.0	0.0	0.1674	0.0110	0.0190	0.0200	0.0001	0.4310	0.0717	0.0300
250880.	6.	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
250880.	6.	5.0	0.0	0.1353	0.0120	0.0163	0.0150	0.0001	0.4242	0.0705	0.0230
250880.	6.	6.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
250880.	6.	7.0	0.0	0.2033	0.0090	0.0273	0.0240	0.0001	0.5287	0.0970	0.0360
250880.	6.	8.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
250880.	6.	9.0	0.0222	0.2303	0.0030	0.0435	0.0530	0.0032	0.3944	0.0812	0.0790
250880.	6.	10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
250880.	6.	11.0	0.0438	0.3795	0.0025	0.0517	0.0920	0.0102	0.3670	0.0895	0.1280
250880.	6.	12.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
250880.	6.	13.0	0.0454	0.3366	0.1726	0.0589	0.0657	0.1702	0.4293	0.0719	0.0365
250880.	6.	14.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
250880.	6.	15.0	0.0397	0.3199	0.0053	0.0545	0.0880	0.0139	0.3658	0.0831	0.1230
250880.	6.	16.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
250880.	7.	0.0	0.0	0.1947	0.0100	0.0286	0.0200	0.0001	0.3710	0.0732	0.0310
250880.	7.	1.0	0.0	0.1027	0.0100	0.0258	0.0160	0.0001	0.3696	0.0597	0.0240
250880.	7.	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
250880.	7.	3.0	0.0	0.1202	0.0090	0.0217	0.0150	0.0001	0.3472	0.0690	0.0220
250880.	7.	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
250880.	7.	5.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
250880.	7.	6.0	0.0	0.1028	0.0100	0.6257	0.0180	0.0001	0.3433	0.0731	0.0270
250880.	7.	7.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
250880.	8.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
250880.	8.	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
250880.	8.	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
250880.	8.	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
250880.	9.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
250880.	9.	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
250880.	9.	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
250880.	9.	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
250880.	9.	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
250880.	10.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
250880.	10.	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
250880.	10.	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
250880.	10.	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
250880.	11.	0.0	0.0	0.0985	0.0090	0.1258	0.0140	0.0001	0.4720	0.0753	0.0200
250880.	11.	1.0	0.0	0.1312	0.0100	0.0326	0.0170	0.0001	0.3781	0.0807	0.0250
250880.	11.	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
250880.	11.	3.0	0.0	0.0930	0.0140	0.0189	0.0140	0.0001	0.3437	0.0735	0.0210
250880.	11.	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
250880.	11.	5.0	0.0031	0.1106	0.0951	0.0300	0.0180	0.0926	0.4328	0.0569	0.0043

DATE	STAT	DEPTH	TEMP	PH	CHLOR	SULPH	BICARB	TOC	CONDUCT	NITRITE	NITRATE	PO4
71080.	1.	0.0	10.50	8.52	86.50	200.00	485.50	64.50	1022.	0.012	0.003	0.210
71080.	1.	1.0	10.50	8.37	86.00	188.00	488.00	53.00	1035.	0.012	0.003	0.110
71080.	1.	2.0	10.45	8.36	0.0	0.0	0.0	0.0	1070.	0.0	0.0	0.0
71080.	1.	3.0	10.45	8.34	86.00	195.00	493.10	53.00	1090.	0.012	0.003	0.090
71080.	1.	4.0	10.45	8.33	0.0	0.0	0.0	0.0	1025.	0.0	0.0	0.0
71080.	1.	5.0	10.50	8.32	88.50	200.00	485.50	53.00	1096.	0.011	0.003	0.090
71080.	1.	6.0	12.35	8.37	0.0	0.0	0.0	0.0	1137.	0.0	0.0	0.0
71080.	1.	7.0	12.50	8.35	90.00	205.00	495.60	55.00	1182.	0.011	0.003	0.100
71080.	1.	8.0	14.05	8.37	0.0	0.0	0.0	0.0	1193.	0.0	0.0	0.0
71080.	1.	9.0	14.55	8.32	80.00	140.00	533.80	57.50	1189.	0.014	0.003	0.160
71080.	1.	10.0	14.50	8.28	0.0	0.0	0.0	0.0	1202.	0.0	0.0	0.0
71080.	1.	11.0	14.40	8.31	79.50	140.00	538.80	75.50	1167.	0.016	0.003	0.210
71080.	2.	0.0	10.45	8.21	85.50	190.00	498.20	54.50	1158.	0.013	0.003	0.090
71080.	0.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.	0.0	0.0	0.0
71080.	2.	1.0	10.45	8.19	85.50	195.00	488.00	54.50	1147.	0.016	0.003	0.090
71080.	2.	2.0	10.40	8.19	0.0	0.0	0.0	0.0	1089.	0.0	0.0	0.0
71080.	2.	3.0	10.40	8.18	85.50	195.00	495.60	58.50	1050.	0.014	0.003	0.100
71080.	2.	4.0	10.40	8.18	0.0	0.0	0.0	0.0	1036.	0.0	0.0	0.0
71080.	2.	5.0	10.35	8.20	85.50	180.00	488.00	55.50	1050.	0.011	0.003	0.080
71080.	2.	6.0	11.80	8.25	0.0	0.0	0.0	0.0	1058.	0.0	0.0	0.0
71080.	2.	7.0	12.65	8.25	85.50	195.00	495.60	56.00	1061.	0.014	0.003	0.110
71080.	2.	8.0	13.80	8.23	0.0	0.0	0.0	0.0	1064.	0.0	0.0	0.0
71080.	2.	9.0	14.45	8.20	0.0	0.0	0.0	0.0	1045.	0.0	0.0	0.0
71080.	2.	10.0	14.50	8.18	85.50	175.00	528.70	73.00	1050.	0.022	0.003	0.200
71080.	2.	11.0	14.35	8.20	0.0	0.0	0.0	0.0	1050.	0.0	0.0	0.0
71080.	2.	12.0	14.40	8.20	0.0	0.0	0.0	0.0	1024.	0.0	0.0	0.0
71080.	2.	13.0	14.50	8.20	80.00	123.00	543.90	63.00	1032.	0.021	0.003	0.160
71080.	2.	16.0	0.0	0.0	81.50	105.00	610.00	0.0	0.	0.038	0.012	0.180
71080.	3.	0.0	10.45	8.12	86.50	195.00	493.10	59.00	1156.	0.019	0.003	0.130
71080.	3.	1.0	10.40	8.09	87.00	190.00	495.60	58.00	1123.	0.019	0.003	0.080
71080.	3.	2.0	10.40	8.07	0.0	0.0	0.0	0.0	1130.	0.0	0.0	0.0
71080.	3.	3.0	10.35	8.04	87.00	200.00	500.70	58.00	1160.	0.018	0.003	0.090
71080.	3.	4.0	10.25	8.04	0.0	0.0	0.0	0.0	1160.	0.0	0.0	0.0
71080.	3.	5.0	10.25	8.07	87.00	200.00	493.10	60.00	1090.	0.021	0.003	0.100
71080.	3.	6.0	12.00	8.17	0.0	0.0	0.0	0.0	1030.	0.0	0.0	0.0
71080.	3.	7.0	13.20	8.13	87.00	195.00	498.20	58.00	1010.	0.022	0.003	0.080
71080.	3.	8.0	13.85	8.09	0.0	0.0	0.0	0.0	1000.	0.0	0.0	0.0
71080.	3.	9.0	14.45	8.10	0.0	0.0	0.0	0.0	1010.	0.0	0.0	0.0
71080.	3.	10.0	14.35	8.08	84.00	175.00	518.50	59.50	1020.	0.024	0.003	0.110
71080.	3.	11.0	14.30	8.06	0.0	0.0	0.0	0.0	1000.	0.0	0.0	0.0
71080.	3.	12.0	14.30	8.09	0.0	0.0	0.0	0.0	990.	0.0	0.0	0.0
71080.	3.	13.0	14.35	8.10	78.00	125.00	549.00	58.00	1000.	0.027	0.003	0.120
71080.	3.	14.0	14.30	8.12	0.0	0.0	0.0	0.0	1021.	0.0	0.0	0.0
71080.	3.	15.0	14.15	8.12	0.0	0.0	0.0	0.0	992.	0.0	0.0	0.0
71080.	3.	16.0	13.80	8.14	77.00	80.00	594.80	74.50	1015.	0.021	0.003	0.260
71080.	3.	20.0	0.0	0.0	63.00	33.00	0.0	0.0	0.	0.075	0.025	0.850
71080.	0.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.	0.0	0.0	0.0
71080.	4.	0.0	10.50	8.12	86.00	195.00	493.10	59.00	1450.	0.019	0.003	0.090
71080.	4.	1.0	10.45	8.10	84.50	195.00	490.50	58.00	1440.	0.014	0.003	0.080
71080.	4.	2.0	10.40	8.08	0.0	0.0	0.0	0.0	1470.	0.0	0.0	0.0
71080.	4.	3.0	10.40	8.06	84.50	195.00	490.50	59.00	1470.	0.015	0.003	0.080
71080.	4.	4.0	10.40	8.06	0.0	0.0	0.0	0.0	1470.	0.0	0.0	0.0
71080.	4.	5.0	10.35	8.05	84.00	190.00	495.50	57.00	1486.	0.014	0.003	0.070
71080.	4.	6.0	11.75	8.12	0.0	0.0	0.0	0.0	1485.	0.0	0.0	0.0
71080.	4.	7.0	13.60	8.14	82.50	195.00	495.50	57.00	1465.	0.010	0.003	0.080
71080.	4.	8.0	14.65	8.10	0.0	0.0	0.0	0.0	1442.	0.0	0.0	0.0
71080.	4.	9.0	14.50	8.05	81.00	165.00	508.30	59.50	1402.	0.018	0.003	0.110
71080.	4.	10.0	14.80	8.03	0.0	0.0	0.0	0.0	1391.	0.0	0.0	0.0

71080.	4.	11.0	14.55	8.03	0.0	0.0	0.0	0.0	1368.	0.0	0.0	0.0
71080.	4.	12.0	14.05	3.05	81.00	160.00	523.60	59.00	1310.	0.019	0.005	0.110
71080.	0.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.	0.0	0.0	0.0
71080.	5.	0.0	10.45	8.07	83.50	195.00	488.00	52.50	1300.	0.016	0.003	0.130
71080.	5.	1.0	10.45	8.05	84.00	195.00	485.50	64.00	1360.	0.011	0.004	0.090
71080.	5.	2.0	10.40	8.06	0.0	0.0	0.0	0.0	1370.	0.0	0.0	0.0
71080.	5.	3.0	10.40	8.06	85.00	188.00	485.50	54.00	1390.	0.011	0.003	0.090
71080.	5.	4.0	10.35	8.05	0.0	0.0	0.0	0.0	1467.	0.0	0.0	0.0
71080.	5.	5.0	10.30	8.05	84.00	195.00	485.50	68.00	1200.	0.008	0.003	0.080
71080.	5.	6.0	11.75	8.10	0.0	0.0	0.0	0.0	1215.	0.0	0.0	0.0
71080.	5.	7.0	13.25	8.07	84.00	190.00	488.00	55.00	1250.	0.008	0.003	0.080
71080.	5.	8.0	15.90	8.07	0.0	0.0	0.0	0.0	1407.	0.0	0.0	0.0
71080.	5.	9.0	15.25	8.02	0.0	0.0	0.0	0.0	1369.	0.0	0.0	0.0
71080.	5.	10.0	15.80	7.98	84.00	180.00	498.20	60.50	1346.	0.010	0.003	0.110
71080.	5.	11.0	15.40	7.99	0.0	0.0	0.0	0.0	1325.	0.0	0.0	0.0
71080.	5.	12.0	14.25	8.04	0.0	0.0	0.0	0.0	1275.	0.0	0.0	0.0
71080.	5.	13.0	14.05	8.09	80.00	130.00	538.80	57.50	1255.	0.021	0.142	0.140
71080.	6.	0.0	10.60	8.04	84.00	195.00	488.00	56.00	1350.	0.009	0.003	0.090
71080.	6.	1.0	10.55	8.05	0.0	0.0	0.0	0.0	1418.	0.0	0.0	0.0
71080.	6.	2.0	10.55	8.05	0.0	0.0	0.0	0.0	1426.	0.0	0.0	0.0
71080.	6.	3.0	10.50	8.05	85.00	195.00	485.50	56.50	1440.	0.011	0.003	0.090
71080.	6.	4.0	10.45	8.05	0.0	0.0	0.0	0.0	1524.	0.0	0.0	0.0
71080.	6.	5.0	10.35	8.05	84.50	190.00	488.00	56.00	1525.	0.012	0.003	0.060
71080.	6.	6.0	11.45	8.08	0.0	0.0	0.0	0.0	1526.	0.0	0.0	0.0
71080.	6.	7.0	13.50	8.11	84.00	195.00	485.50	55.50	1533.	0.011	0.003	0.070
71080.	6.	8.0	16.15	8.08	0.0	0.0	0.0	0.0	1540.	0.0	0.0	0.0
71080.	6.	9.0	15.45	8.04	0.0	0.0	0.0	0.0	1470.	0.0	0.0	0.0
71080.	6.	10.0	15.75	8.02	88.00	190.00	505.80	61.00	1472.	0.017	0.003	0.120
71080.	6.	11.0	15.95	8.00	0.0	0.0	0.0	0.0	1440.	0.0	0.0	0.0
71080.	6.	12.0	15.70	8.00	0.0	0.0	0.0	0.0	1360.	0.0	0.0	0.0
71080.	6.	13.0	15.45	8.00	81.50	150.00	523.60	59.50	1340.	0.015	0.003	0.130
71080.	6.	14.0	15.25	8.02	0.0	0.0	0.0	0.0	1327.	0.0	0.0	0.0
71080.	6.	15.0	14.60	8.05	0.0	0.0	0.0	0.0	1287.	0.0	0.0	0.0
71080.	6.	16.0	14.60	8.05	76.00	70.00	584.60	60.00	1270.	0.041	0.004	0.100
71080.	7.	0.0	10.70	8.38	0.0	0.0	0.0	0.0	952.	0.0	0.0	0.0
71080.	7.	1.0	10.65	8.38	0.0	0.0	0.0	0.0	1099.	0.0	0.0	0.0
71080.	7.	2.0	10.55	8.37	0.0	0.0	0.0	0.0	1120.	0.0	0.0	0.0
71080.	7.	3.0	10.50	8.37	0.0	0.0	0.0	0.0	1140.	0.0	0.0	0.0
71080.	7.	4.0	10.45	8.34	0.0	0.0	0.0	0.0	1170.	0.0	0.0	0.0
71080.	7.	5.0	10.45	8.30	0.0	0.0	0.0	0.0	1200.	0.0	0.0	0.0
71080.	7.	6.0	12.25	8.26	0.0	0.0	0.0	0.0	1125.	0.0	0.0	0.0
71080.	7.	7.0	13.30	8.18	0.0	0.0	0.0	0.0	1050.	0.0	0.0	0.0
71080.	7.	8.0	15.35	8.10	0.0	0.0	0.0	0.0	1010.	0.0	0.0	0.0
71080.	7.	9.0	15.40	8.04	0.0	0.0	0.0	0.0	1015.	0.0	0.0	0.0
71080.	7.	10.0	15.65	7.98	0.0	0.0	0.0	0.0	1020.	0.0	0.0	0.0

DATE	STAT	DEPTH	BITUMEN	TSOLIDS	SPMGRAV	NA	K	CA	MG	FE	MN	AL
71080.	1.	0.0	239.1	0.62	0.51	289.30	18.85	6.47	4.14	0.9946	0.0425	3.1880
71080.	1.	1.0	208.9	0.62	0.45	300.00	15.45	6.52	4.18	1.1210	0.0532	3.8230
71080.	1.	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
71080.	1.	3.0	215.5	0.62	0.49	295.90	14.80	6.42	4.13	1.0730	0.0423	3.6150
71080.	1.	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
71080.	1.	5.0	235.8	0.65	0.51	296.20	14.36	6.99	4.38	1.1390	0.0422	3.9220
71080.	1.	6.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
71080.	1.	7.0	256.2	0.67	0.53	311.20	22.56	7.75	4.70	1.2230	0.0397	4.2650
71080.	1.	8.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
71080.	1.	9.0	950.6	2.10	1.85	299.90	24.31	4.86	3.88	2.8750	0.0393	10.3300
71080.	1.	10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
71080.	1.	11.0	965.1	2.08	1.84	298.60	24.95	4.88	3.85	2.8270	0.0400	10.0000
71080.	2.	0.0	212.6	0.62	0.46	307.80	21.32	6.29	4.13	1.1950	0.0400	4.0850
71080.	0.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
71080.	2.	1.0	202.2	0.62	0.49	307.40	20.67	6.33	4.14	1.2160	0.0412	4.1650
71080.	2.	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
71080.	2.	3.0	209.2	0.62	0.48	306.90	19.69	6.28	4.10	1.1770	0.0405	3.9730
71080.	2.	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
71080.	2.	5.0	147.3	0.62	0.48	299.30	21.48	6.38	4.15	1.2170	0.0416	4.1390
71080.	2.	6.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
71080.	2.	7.0	228.5	0.63	0.49	297.90	20.93	6.57	4.24	1.3250	0.0436	4.6740
71080.	2.	8.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
71080.	2.	9.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
71080.	2.	10.0	356.9	1.01	0.81	296.80	21.91	5.29	3.92	2.2750	0.0438	8.1460
71080.	2.	11.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
71080.	2.	12.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
71080.	2.	13.0	883.9	2.36	2.14	290.00	20.00	4.92	4.22	3.8850	0.0572	14.5200
71080.	2.	16.0	67576.9	16.21	15.20	304.80	56.06	7.14	5.06	3.1710	0.0413	10.0600
71080.	3.	0.0	145.6	0.61	0.48	298.40	16.03	6.34	4.17	1.3350	0.0444	4.7040
71080.	3.	1.0	215.5	0.62	0.48	308.40	14.90	6.28	4.12	1.1330	0.0390	3.6550
71080.	3.	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
71080.	3.	3.0	206.8	0.62	0.50	306.00	14.29	6.39	4.15	1.2030	0.0418	4.0260
71080.	3.	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
71080.	3.	5.0	190.1	0.61	0.47	302.40	14.59	6.39	4.05	0.9324	0.0399	2.9820
71080.	3.	6.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
71080.	3.	7.0	212.4	0.61	0.45	304.50	21.34	6.25	4.11	1.1430	0.0383	3.8930
71080.	3.	8.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
71080.	3.	9.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
71080.	3.	10.0	468.2	1.06	0.91	304.10	20.78	5.01	3.68	1.9380	0.0368	6.6360
71080.	3.	11.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
71080.	3.	12.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
71080.	3.	13.0	1107.2	2.37	2.17	291.80	20.53	4.57	3.76	3.3630	0.0400	11.9400
71080.	3.	14.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
71080.	3.	15.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
71080.	3.	16.0	5496.6	6.78	6.52	288.60	19.69	4.27	3.77	3.6960	0.0950	14.6400
71080.	3.	20.0	22405.2	25.96	24.65	0.0	0.0	0.0	0.0	0.0	0.0	0.0
71080.	0.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
71080.	4.	0.0	211.4	0.65	0.50	301.30	16.44	6.23	4.22	1.7080	0.0432	6.3870
71080.	4.	1.0	212.6	0.62	0.48	299.80	14.70	6.15	4.08	1.2940	0.0401	4.5480
71080.	4.	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
71080.	4.	3.0	201.4	0.62	0.47	301.70	21.18	6.04	4.06	1.3550	0.0349	4.8360
71080.	4.	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
71080.	4.	5.0	193.4	0.62	0.48	303.90	20.05	6.16	4.08	1.3140	0.0381	4.6130
71080.	4.	6.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
71080.	4.	7.0	197.4	0.62	0.47	302.30	18.86	6.14	4.05	1.2980	0.0378	4.5720
71080.	4.	8.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
71080.	4.	9.0	481.2	1.18	1.01	309.00	19.87	4.80	3.84	2.5970	0.0953	9.4430
71080.	4.	10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

71080.	4.	11.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
71080.	4.	12.0	510.5	1.24	1.05	303.80	18.62	4.77	3.72	2.5870	0.0471	9.2740
71080.	0.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
71080.	5.	0.0	212.5	0.62	0.47	303.90	18.30	6.25	4.10	1.3220	0.0420	4.6080
71080.	5.	1.0	164.1	0.62	0.47	303.10	19.65	6.35	4.00	0.8646	0.0377	3.1210
71080.	5.	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
71080.	5.	3.0	186.2	0.62	0.48	300.30	18.86	6.28	3.97	0.8932	0.0371	3.1910
71080.	5.	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
71080.	5.	5.0	183.2	0.62	0.47	304.30	19.15	6.46	4.01	0.8814	0.0387	3.1570
71080.	5.	6.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
71080.	5.	7.0	197.5	0.62	0.48	301.70	17.94	6.27	4.02	0.9752	0.0386	3.2200
71080.	5.	8.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
71080.	5.	9.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
71080.	5.	10.0	455.6	1.09	0.96	307.20	19.17	5.22	3.88	2.0940	0.0390	7.6240
71080.	5.	11.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
71080.	5.	12.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
71080.	5.	13.0	1114.5	2.75	2.58	294.70	21.57	4.62	3.95	3.5320	0.0391	13.0300
71080.	6.	0.0	191.4	0.62	0.47	295.20	14.59	6.36	4.04	0.9168	0.0427	3.0600
71080.	6.	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
71080.	6.	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
71080.	6.	3.0	174.2	0.62	0.49	297.50	14.20	6.33	4.05	1.0390	0.0402	3.5350
71080.	6.	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
71080.	6.	5.0	186.8	0.61	0.50	290.60	13.35	6.05	3.91	0.8754	0.0357	2.8840
71080.	6.	6.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
71080.	6.	7.0	198.5	0.64	0.51	302.60	12.61	5.47	3.87	1.0720	0.0372	3.6080
71080.	6.	8.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
71080.	6.	9.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
71080.	6.	10.0	449.1	1.19	1.04	308.20	13.97	4.87	3.91	2.6960	0.0460	9.8530
71080.	6.	11.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
71080.	6.	12.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
71080.	6.	13.0	1072.6	2.69	2.51	299.10	14.04	4.10	3.53	2.8700	0.0376	10.5300
71080.	6.	14.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
71080.	6.	15.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
71080.	6.	16.0	20644.3	14.60	12.92	276.20	18.80	4.51	3.11	1.9690	0.0238	7.0930
71080.	7.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
71080.	7.	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
71080.	7.	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
71080.	7.	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
71080.	7.	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
71080.	7.	5.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
71080.	7.	6.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
71080.	7.	7.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
71080.	7.	8.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
71080.	7.	9.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
71080.	7.	10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

DATE	STAT	DEPTH	V	TI	CO	MO	CD	ZN	B	BA	PB
71080.	1.	0.0	0.0136	0.2025	0.0017	0.0499	0.0048	0.0	1.0720	0.0	0.0100
71080.	1.	1.0	0.0091	0.2085	0.0101	0.0372	0.0	0.0036	1.0940	0.0	0.0249
71080.	1.	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
71080.	1.	3.0	0.0105	0.1983	0.0023	0.0292	0.0013	0.0	1.0700	0.0	0.0123
71080.	1.	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
71080.	1.	5.0	0.0119	0.2299	0.0026	0.0350	0.0020	0.0	1.0710	0.0	0.0184
71080.	1.	6.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
71080.	1.	7.0	0.0075	0.2561	0.0050	0.0447	0.0100	0.0001	1.0830	0.0002	0.0150
71080.	1.	8.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
71080.	1.	9.0	0.0200	0.3216	0.0070	0.0507	0.0250	0.0001	1.0440	0.0	0.0360
71080.	1.	10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
71080.	1.	11.0	0.0231	0.3739	0.0070	0.0517	0.0240	0.0001	1.0320	0.0	0.0270
71080.	2.	0.0	0.0102	0.2043	0.0030	0.0488	0.0100	0.0001	1.0720	0.0007	0.0060
71080.	0.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
71080.	2.	1.0	0.0137	0.2053	0.0010	0.0460	0.0090	0.0	1.0830	0.0091	0.0050
71080.	2.	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
71080.	2.	3.0	0.0121	0.2164	0.0010	0.0473	0.0080	0.0	1.0840	0.0088	0.0040
71080.	2.	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
71080.	2.	5.0	0.0094	0.2367	0.0020	0.0553	0.0100	0.0001	1.1870	0.0150	0.0140
71080.	2.	6.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
71080.	2.	7.0	0.0111	0.2677	0.0018	0.0316	0.0110	0.0001	1.1010	0.0215	0.0110
71080.	2.	8.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
71080.	2.	9.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
71080.	2.	10.0	0.0207	0.3490	0.0011	0.0378	0.0130	0.0	1.1020	0.0150	0.0020
71080.	2.	11.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
71080.	2.	12.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
71080.	2.	13.0	0.0295	0.4142	0.0092	0.0368	0.0160	0.0008	1.0240	0.0193	0.0040
71080.	2.	16.0	0.0256	0.0568	0.0010	0.0388	0.0230	0.0001	0.9213	0.0046	0.0180
71080.	3.	0.0	0.0104	0.2724	0.0021	0.0246	0.0110	0.0001	1.0810	0.0186	0.0030
71080.	3.	1.0	0.0072	0.2546	0.0020	0.0202	0.0090	0.0001	1.1040	0.0446	0.0130
71080.	3.	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
71080.	3.	3.0	0.0083	0.3010	0.0019	0.0212	0.0100	0.0001	1.1120	0.0212	0.0140
71080.	3.	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
71080.	3.	5.0	0.0063	0.1946	0.0010	0.0138	0.0080	0.0001	1.1020	0.0060	0.0100
71080.	3.	6.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
71080.	3.	7.0	0.0134	0.2982	0.0020	0.1641	0.0110	0.0	1.2580	0.0224	0.0030
71080.	3.	8.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
71080.	3.	9.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
71080.	3.	10.0	0.0183	0.2614	0.0040	0.0653	0.0170	0.0001	1.1800	0.0261	0.0230
71080.	3.	11.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
71080.	3.	12.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
71080.	3.	13.0	0.0266	0.3517	0.0	0.0626	0.0270	0.0001	1.0680	0.0287	0.0340
71080.	3.	14.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
71080.	3.	15.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
71080.	3.	16.0	0.0403	0.2186	0.0680	0.0715	0.0448	0.0498	1.0550	0.0093	0.0483
71080.	3.	20.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
71080.	0.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
71080.	4.	0.0	0.0193	0.3338	0.0039	0.0611	0.0060	0.0	1.1120	0.0305	0.0007
71080.	4.	1.0	0.0136	0.2615	0.0010	0.0507	0.0110	0.0001	1.0950	0.0308	0.0090
71080.	4.	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
71080.	4.	3.0	0.0115	0.2909	0.0001	0.0487	0.0120	0.0	1.0560	0.0202	0.0170
71080.	4.	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
71080.	4.	5.0	0.0099	0.2546	0.0030	0.0519	0.0110	0.0001	1.0850	0.0339	0.0160
71080.	4.	6.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
71080.	4.	7.0	0.0098	0.2568	0.0030	0.0490	0.0110	0.0001	1.0760	0.0353	0.0160
71080.	4.	8.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
71080.	4.	9.0	0.0208	0.3088	0.0572	0.0569	0.0275	0.0333	1.0990	0.0227	0.0132
71080.	4.	10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

71080.	4.	11.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
71080.	4.	12.0	0.0175	0.3251	0.0100	0.0511	0.0220	0.0001	1.0840	0.0321	0.0320
71080.	0.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
71080.	5.	0.0	0.0081	0.3264	0.0003	0.0502	0.0110	0.0001	1.0790	0.0304	0.0160
71080.	5.	1.0	0.0	0.1958	0.0070	0.0474	0.0070	0.0001	1.0880	0.0	0.0110
71080.	5.	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
71080.	5.	3.0	0.0004	0.1051	0.0080	0.0263	0.0070	0.0001	1.0840	0.0	0.0110
71080.	5.	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
71080.	5.	5.0	0.0	0.1193	0.0080	0.0357	0.0070	0.0001	1.1050	0.0	0.0110
71080.	5.	6.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
71080.	5.	7.0	0.0067	0.1829	0.0020	0.0381	0.0080	0.0001	1.0890	0.0386	0.0110
71080.	5.	8.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
71080.	5.	9.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
71080.	5.	10.0	0.0187	0.2447	0.0052	0.0294	0.0170	0.0001	1.1650	0.0422	0.0240
71080.	5.	11.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
71080.	5.	12.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
71080.	5.	13.0	0.0294	0.2442	0.0124	0.0503	0.0100	0.0001	1.0940	0.0364	0.0100
71080.	6.	0.0	0.0153	0.1974	0.0096	0.0	0.0158	0.0	1.2230	0.0424	0.0262
71080.	6.	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
71080.	6.	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
71080.	6.	3.0	0.0132	0.1921	0.0061	0.0	0.0030	0.0	1.1680	0.0425	0.0096
71080.	6.	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
71080.	6.	5.0	0.0137	0.1965	0.0080	0.0	0.0020	0.0	1.1200	0.0402	0.0089
71080.	6.	6.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
71080.	6.	7.0	0.0124	0.2101	0.0120	0.0	0.0060	0.0	1.1180	0.0288	0.0009
71080.	6.	8.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
71080.	6.	9.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
71080.	6.	10.0	0.0201	0.2517	0.0154	0.0	0.0130	0.0001	1.2020	0.0472	0.0160
71080.	6.	11.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
71080.	6.	12.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
71080.	6.	13.0	0.0239	0.3158	0.0097	0.0	0.0210	0.0001	1.1400	0.0406	0.0260
71080.	6.	14.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
71080.	6.	15.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
71080.	6.	16.0	0.0190	0.0778	0.0031	0.0680	0.0170	0.0001	1.2160	0.0380	0.0250
71080.	7.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
71080.	7.	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
71080.	7.	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
71080.	7.	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
71080.	7.	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
71080.	7.	5.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
71080.	7.	6.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
71080.	7.	7.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
71080.	7.	8.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
71080.	7.	9.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
71080.	7.	10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

APPENDIX III

Calculation of Density of Tailings Pond Water

using the Measured SPM Values (R. Schutte, pers. comm.)

$$\text{Density of Tailings Water} = \frac{1}{1 - .62S}$$

where S = wt % of SPM

For 1 g of Tailings Water:

$$\text{Density} = g\ cc^{-1} = \frac{1}{\text{volume}}$$

$$\begin{aligned} \text{1 g of Tailings Water} &= \text{wt \% Solids} + \text{wt \% Water} \\ &= S + W \end{aligned}$$

$$\text{Volume of Solids} = \frac{S}{\rho_s}$$

where ρ_s = 2.6 g cc^{-1}

$$\text{Volume of Water} = \frac{W}{\rho_w}$$

where $\rho_w \simeq$ 1.0 g cc^{-1}

$w = 1 - s$

$$\begin{aligned} \text{Density of Tailings Pond Waters} &= \frac{1}{\text{solids volume} + \text{water volume}} \\ &= \frac{1}{\frac{s}{\rho_s} + \frac{w}{\rho_w}} \\ &= \frac{\rho_s \rho_w}{S\rho_w + W\rho_s} \\ &= \frac{\rho_w}{S\frac{\rho_w}{\rho_s} + W} \end{aligned}$$

Since $W = 1 - S$

$$= \frac{\rho_w}{S \frac{\rho_w}{\rho_s} + 1 - S}$$

$$= \frac{\rho_w}{1 - (1 - \frac{\rho_w}{\rho_s}) S}$$

Since $\frac{\rho_w}{\rho_s} = \frac{1}{2.6} \simeq .38$

$\therefore$ Density of tailings water $= \frac{\rho_w}{1 - (1 - .38) S}$

$$= \frac{\rho_w}{1 - .62S}$$

$$= \frac{1}{1 - .62S}$$