STEADY-STATE AND DYNAMIC BEHAVIOUR OF COMBINED AND SEPARATE SLUDGE CARBON REMOVAL-NITRIFICATION SYSTEMS

STEADY-STATE AND DYNAMIC BEHAVIOUR OF COMBINED AND SEPARATE SLUDGE CARBON REMOVAL-NITRIFICATION SYSTEMS

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ABSTRACT

This dissertation examines the degree of nitrification which can be accomplished in combined and separate activated sludge systems over a temperature range of 5^{0} to $25^{0}C$ and a system solids residence time range of 4 to 10 days under both steady and non-steady operating conditions.

Treating municipal sewage under steady flow conditions, it was found that the rate of nitrification was independent of the concentration of filterable TKN or ammonia. Temperature and solids retention time significantly affected filterable TKN removal. The degree of nitrification obtained in both combined and separate sludge systems was comparable.

The parallel pilot plant systems were subjected to a number of non-steady influent conditions. The responses to a pulse change in influent pH and a step-down in temperature indicated that the separate sludge system had a greater capacity to withstand such conditions. Transfer function models, together with time series models, were developed to describe the dynamic responses of the nitrifying systems to changes in influent flow, and organic carbon and inorganic nitrogen concentration. The observed and model results indicated greater effluent filterable TKN variation can be expected from nitrifying systems operated under variable flow and concentration inputs than for variable concentration inputs alone.

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INTRODUCTION

The original approach to waste treatment was to provide processes for the removal of settleable solids, the reduction of biochemical oxygen demand (BOD), and the elimination of bacterial contaminants. In recent years, eutrophication problems have focused attention on the requirement for nutrient control; phosphorus or nitrogen are considered to be the nutrients limiting algal production. As phosphorus was identified as the major pollutant, an intensive research program conducted over the past decade, has resulted in the development and full scale evaluation of phosphorus removal processes which are practical and economical.

Recently, research has led to the development of nitrogen removal technology. Deficiencies in process design for nitrogen removal still exist as clearly pointed out in this quotation from the Report of the WPCF Research Committee (1975);

> "There have been many studies on the removal of nitrogen from wastewaters, but clear-cut design parameters that permit the application of treatment processes without difficulty have yet to be established. Pilot or large scale studies are now required to demonstrate the efficiency and reliability of available processes and attendant operational problems and their remedy."

Nitrogen control can be divided into two categories. The first involves processes which convert organic and ammonia nitrogen into nitrate nitrogen. The second category involves processes resulting in the complete removal of nitrogen from the wastewater.

The first category normally is termed nitrification and is effective in eliminating many problems associated with organic and ammonia nitrogen. The biochemical oxygen demand (BOD) of municipal wastes will be substantially influenced by the presence of ammonia. The conversion of ammonia to nitrate requires 4.6 parts of oxygen for each part of ammonia nitrogen. Therefore, ammonia in the effluent at concentrations of 20 mg/l as N would give a theoretical nitrogenous oxygen demand of 92 mg/l.

Additional reasons for ammonia nitrogen removal include:

1) NH_3 at low concentrations is toxic to fish,
2) NH_3 is corrosive to copper fittings,

3) NH_3 increases Cl_2 breakpoint requirements and contact time for adequate disinfection, and
4) eutrophication problems are associated with high nitrogen effluents.

Nitrogenous compounds enter the aquatic environment from natural and man-induced sources. Natural sources include dustfall, precipitation, nonurban runoff, and biological fixation. The quantities from natural sources can be increased by man's activity. For example, the combustion of fossil fuels can increase rainfall concentrations of nitrogen substantially. Nitrogen sources which can be directly attributed to man's activity include:

1) municipal wastewater,
2) industrial wastewater,
3) runoff from urban areas,
4) runoff from livestock feedlots, and
5) drainage from agricultural lands.

The significance of each source will vary depending on the population density, the degree of industrial development, and the farming practices in each particular area. An estimate of the nitrogen quantities, from various sources discharged in the San Francisco Bay Basin, California, is given in Table 1. Owing to the high degree of industrialization and large population density, municipal and industrial contributions are most significant.

Nitrogen control can be accomplished by either biological or physical-chemical means. A review of the advantages and disadvantages of a number of control alternatives (Sutton, Murphy, and Dawson, 1974) indicates that biological nitrification-denitrification may be the preferred approach. The popularity of this alternative is evident from the recent IAWPR conference proceedings (1975) entitled "Conference on Nitrogen as a Water Pollutant".

Biological nitrogen removal is essentially a two-step process, nitrification followed by denitrification. In the nitrification step, under aerobic conditions, autotrophic nitrifying organisms oxidize ammonia to nitrate. In the denitrification step, nitrate is reduced to molecular nitrogen by heterotrophic organisms in the absence of molecular oxygen.

TABLE 1 NITROGEN LOADINGS FOR THE SAN FRANCISCO BAY BASIN
(Brown and Caldwell, 1975)

Nitrogen Source	Nitrogen Discharge 1000 kg/yr	Percent of total
Municipal wastewater, before treatment	26,000	49
Industrial wastewater, before treatment	16,000	30
Vessel wastes, before treatment	60	0.1
Dustfall directly on Bay	590	1.1
Rainfall directly on Bay	390	0.8
Urban runoff	1,400	2.7
Non-urban runoff	1,900	3.6
Nitrogen applied to irrigated agricultural land	900	1.7
Nitrogen from dairies and feedlots	6,000	11
Total	53,000	100

Nitrification occurs in the activated sludge process when conditions are suitable for the retention and accumulation of nitrifying bacteria. The solids retention time (SRT), or sludge age, is a measure of the average retention time of the bacterial cells in the system. Successful nitrification depends on adherence to a sludge wasting program which results in an SRT adequate to retain and prevent the wash out of the slower growing nitrifying bacteria. Two basic process schemes available can be designated as:

1) a combined sludge system, and
2) a separate sludge system.

The combined sludge system may be a single or multi-stage system, while the separate sludge system is normally a two-stage system (Figure 1). In the combined sludge process, simultaneous carbon removal and nitrification are carried out. Provided that the rate of growth of nitrifying bacteria is sufficiently rapid to compensate for the organisms lost through sludge wasting, nitrification can be maintained. Consequently, nitrification depends upon the relationship of the growth rate of the nitrifying bacteria to the net solids production rate for the process. In the separate sludge system, carbon removal is carried out by heterotrophic microorganisms, separate and distinct from the subsequent nitrification step carried out by autotrophs. Thus separate sludge wasting procedures for each removal step can be incorporated.

There are advantages and disadvantages to both the combined and separate sludge systems. A separate system could be expected to offer more stability, less temperature sensitivity, and some buffering capacity to compounds toxic or inhibitory to nitrification. These advantages must be balanced against the possible overall increases in solids production and capital cost.

Parameter values derived from time averaged pseudo "steady-state" (constant flow with normal diurnal variations in organic and inorganic concentrations) data allow prediction of the average effluent concentration of filterable TKN (Sutton, Murphy, Jank, and Monaghan, 1975). This form of analysis may not be sensitive enough to differentiate between the alternative carbon removal-nitrification systems operating under "non-steady" conditions.

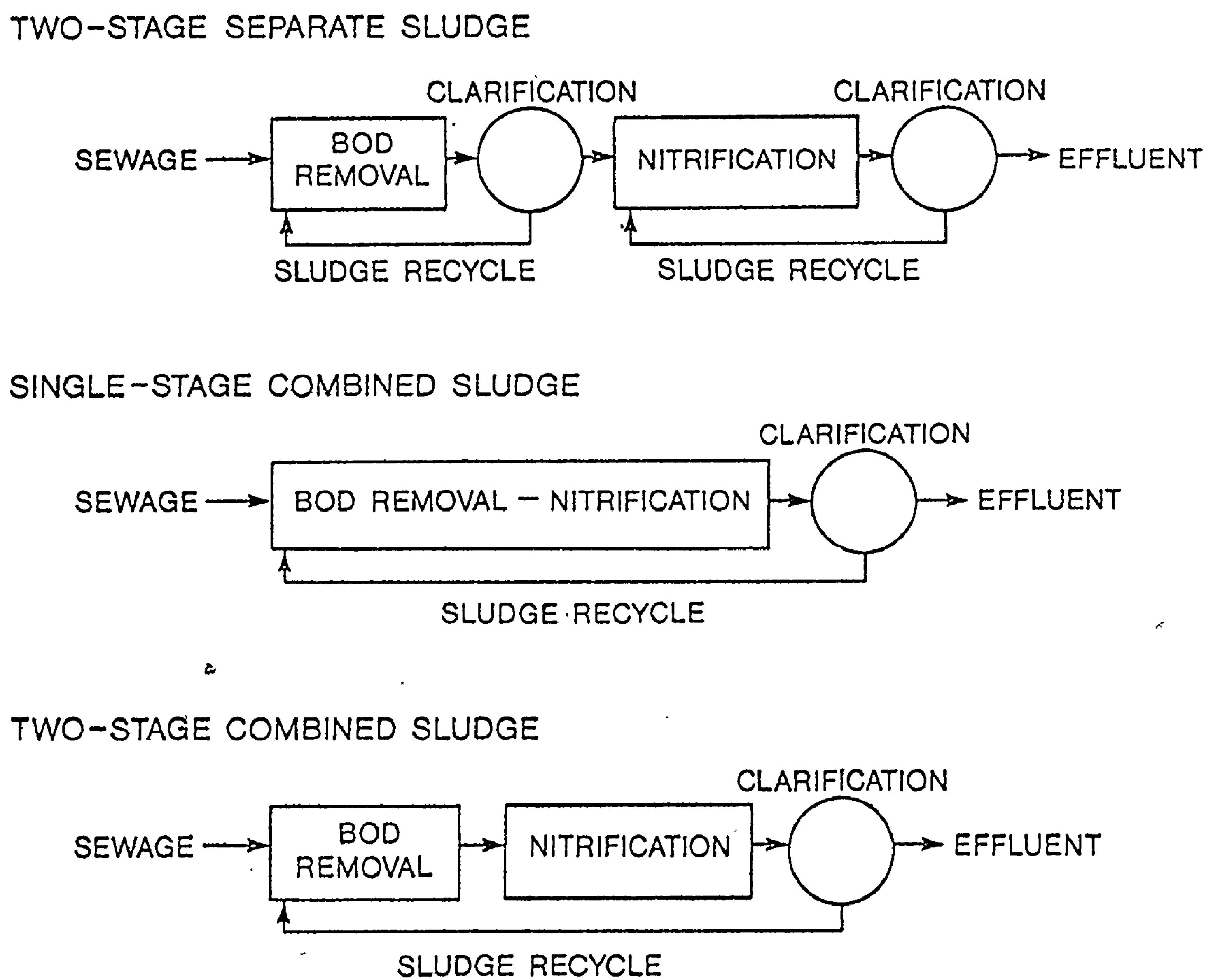


FIG. 1 SEPARATE AND COMBINED SLUDGE CARBON REMOVAL - NITRIFICATION SYSTEMS

Nitrification systems, like all activated sludge processes, are dynamic systems subject to time varying loadings and exhibiting a response to their environment which varies with time. Pseudo "steady-state" parameter values are not capable of describing the temporal relationships between inputs and outputs. The stability of the nitrification alternatives can be obtained only by using techniques which elucidate the responses to non-steady operation.

Significant changes in raw wastewater pH are encountered periodically at municipal treatment plants receiving quantities of industrial wastes. Variations in temperature may be anticipated in treatment facilities in continental climates. The reported sensitivity of nitrification to temperature and pH (Wild, Sawyer, and McMahon, 1971) emphasizes the importance of defining the tolerance of such systems to abrupt changes in these factors.

This study has examined, at pilot-scale, the carbon removal and nitrification efficiencies obtained from three differing process configurations - a "single" and "two-stage" combined sludge systems (denoted SSC and TSC respectively) and a two-stage separate sludge system (TSS). The alternatives (Figure 1) were compared as to their effectiveness, in terms of nitrification, under a range of operating temperatures and solids retention times, at pseudo "steady-state" conditions.

Experimental observation, mathematical model building and simulation, and time series analysis are techniques by which the behaviour of dynamic processes can be assessed. In this study, these methods were utilized to compare the alternative carbon removal-nitrification schemes and provide a better understanding of factors affecting nitrification under non-steady conditions.

BACKGROUND

Principles of Biological Nitrification

Microbiology and biochemistry

Biological oxidation of inorganic nitrogen is almost entirely carried out in the aquatic environment by bacteria belonging to the family Nitrobacteraceae. The major well defined autotrophic bacteria which are known to oxidize ammonia to nitrite are the genera Nitrosomonas and Nitrosococcus. The genera Nitrobacter and Nitrocystis have been shown to oxidize nitrite to nitrate. The ability to oxidize inorganic nitrogen is not restricted to autotrophic bacteria. Verstraete and Alexander (1973) have demonstrated that heterotrophic nitrification occurs in soils, in sewage treatment plants, and in river and lake waters. Although a large number of heterotrophs have been identified as nitrifiers (Painter, 1975), heterotrophic nitrification appears to be of much less importance than autotrophic nitrification.

The autotrophic nitrifying organisms derive all their energy requirements for growth and cellular metabolism from the free energy released by the oxidation of an inorganic nitrogen substrate. The source of carbon used for growth is obtained from carbon dioxide or bicarbonate. The bacterial oxidation reactions of ammonia to nitrite and nitrite to nitrate can be represented by the following equations:

$$NH_4^+ + 1.5\ O_2 \rightarrow 2\ H^+ + H_2O + NO_2^- \qquad ....(1)$$

$$NO_2^- + 0.5\ O_2 \rightarrow NO_3^- \qquad ....(2)$$

In the oxidation of ammonia to nitrite, nitrogen undergoes an oxidation state change from -3 to +3. This suggests that the reaction takes place in three steps since all known biochemical reaction mechanisms transfer one pair of electrons at a time. Kluyver and Donker (1926) postulated a three step sequence according to:

$$NH_4^+ \rightarrow NH_2OH \rightarrow H_2N_2O_2 \rightarrow NO_2^- \qquad ....(3)$$

The intermediate, hydroxylamine (NH_2OH), was reported first by Hofman and Lees (1953) and has since been demonstrated as an intermediate by several other researchers. The formation of the second oxidation product, hyponitrite ($H_2N_2O_2$) has not yet been verified. In the oxidation of nitrite to nitrate, the nitrogen atom changes its oxidation state from +3 to +5 suggesting a one step reaction mechanism. No intermediates have been found in this enzymatic oxidation. The difference in free energy released in the oxidation reactions, 65.2 to 84.0 kcal/mole for ammonia oxidation and 17.5 to 24.0 kcal/mole for nitrite oxidation (Gibbs and Schiff, 1960) indicates that nitrite oxidation proceeds through a much simpler mechanism. The chemical energy released is stored or used in the form adenosine triphosphate (ATP). The generation of reducing compounds enables the nitrifiers to reduce carbon dioxide to the oxidation level of cellular components thereby removing the need for an organic carbon substrate as a carbon source.

Reaction kinetics

The growth rate of a bacterial culture is a function of the concentration of some limiting substrate. For many biological systems the Monod kinetic model has been found to represent this growth rate and limiting substrate relationship:

$$u = \frac{u^* S}{K_s + S} , \qquad \text{........(4)}$$

where u = growth rate (T^{-1}),
u^*= maximum growth rate coefficient (T^{-1}),
S = substrate concentration (M/L^3), and
K_s= substrate concentration at one half maximum growth rate (M/L^3).

Downing, Painter, and Knowles (1964), Poduska and Andrews (1975), and Knowles, Downing, and Barrett (1965) used the Monod kinetic model in their rate expressions in analyzing nitrification results. Applying the expression to the ammonia oxidation by Nitrosomonas, the K_s values determined were small (0.2 to 1.7 mg/l NH_4^+ -N, Knowles, Downing and

Barrett, 1975). A greater range of K_s values have been reported for Nitrobacter but generally indicate that the oxidation reaction can be considered independent of NO_2^- -N.

The maximum growth rate coefficient (u*) represents the mass of organisms produced per unit mass of organisms per unit time when growing at non-limiting substrate concentrations. A wide range of values of the coefficient for both Nitrosomonas (Loveless and Painter, 1968) and Nitrobacter (Boon and Laudelot, 1962) have been reported. The difference in culture conditions (pH, temperature, etc.) may account for the varying results. The substrate utilization rate (K) can be related to the growth rate coefficient by consideration of the yield coefficient (Y):

$$K = \frac{u^*}{Y} \qquad \text{.........(5)}$$

Using reported values of actual cell yields and $C_5H_7O_2N$ as an empirical cell formula for nitrifying bacteria, Haug and McCarty (1972) proposed the following overall mass balances combining nitrification assimilation:

Nitrosomonas $55\ NH_4^+ + 5\ CO_2 + 76\ O_2 \rightarrow$

$$C_5H_7O_2N + 54\ NO_2^- + 52\ H_2O + 109\ H^+ \qquad \text{........(6)}$$

Nitrobacter $400\ NO_2^- + 5\ CO_2 + NH_4^+ + 195\ O_2 + H_2O$

$$\rightarrow C_5H_7O_2N + 400\ NO_3^- + H^+ \qquad \text{.........(7)}$$

On the basis of the equations, 20 mg of ammonia nitrogen would produce only 3 mg of Nitrosomonas and approximately 0.5 mg of Nitrobacter. These yields are less than 10 percent of that normally observed for heterotrophic bacteria.

The growth of microorganisms may also be expressed in terms of their doubling or generation time (t_d). This coefficient is related to the substrate utilization rate (K) according to:

$$K = \ln 2/t_d\, Y \qquad ......(8)$$

Substituting appropriate K and Y values it is found that the generation times of the autotrophic nitrifying bacteria are in the range of 10 to 30 hours. Generation times for heterotrophic bacteria are frequently reported as 20 to 40 minutes. In a suspended growth or activated sludge system, a direct consequence of the slow growth rate or long generation time of nitrifiers, is the requirement to provide a sufficient solids retention time (SRT) or sludge age to retain an adequate population of these organisms. Solids retention time is a measure of the average retention time of the bacterial cells in the system. The SRT and the growth rate of organisms in an activated sludge plant are related according to:

$$SRT = \frac{1}{u} \qquad ....(9)$$

SRT is normally defined as the total mixed liquor suspended solids under aeration divided by the daily solids lost in the effluent or through sludge wasting.

Environmental factors

Autotrophic nitrifying organisms are obligate aerobes. Numerous reports indicate that in order to ensure that dissolved oxygen is not a limiting nutrient for nitrification, a level not less than 2.0 mg/l must be maintained (Wuhrmann, 1963, Painter, 1975). The stoichiometric oxygen requirements based on equations 1 and 2 are 3.43 mg oxygen/mg NH_4^+-N and 1.14 mg oxygen/mg NO_2^--N. Jeffrey and Morgan (1959) found that oxygen uptake values in BOD tests for nitrification were within 2.5 percent of the theoretical values.

Nitrification, like most bacterial processes, is affected by pH conditions. Generally optimum conditions have been found to exist between pH 8.0 and 9.0 (Figure 2). Variations in pH optima could be due to shock effects in adjusting culture conditions or improper acclimation. Haug and McCarty (1971) using a submerged aerobic filter found that the rate of nitrification at pH 6.0 approached rates at higher pH conditions (7 to 8.5) after an acclimation period of approximately 10 days.

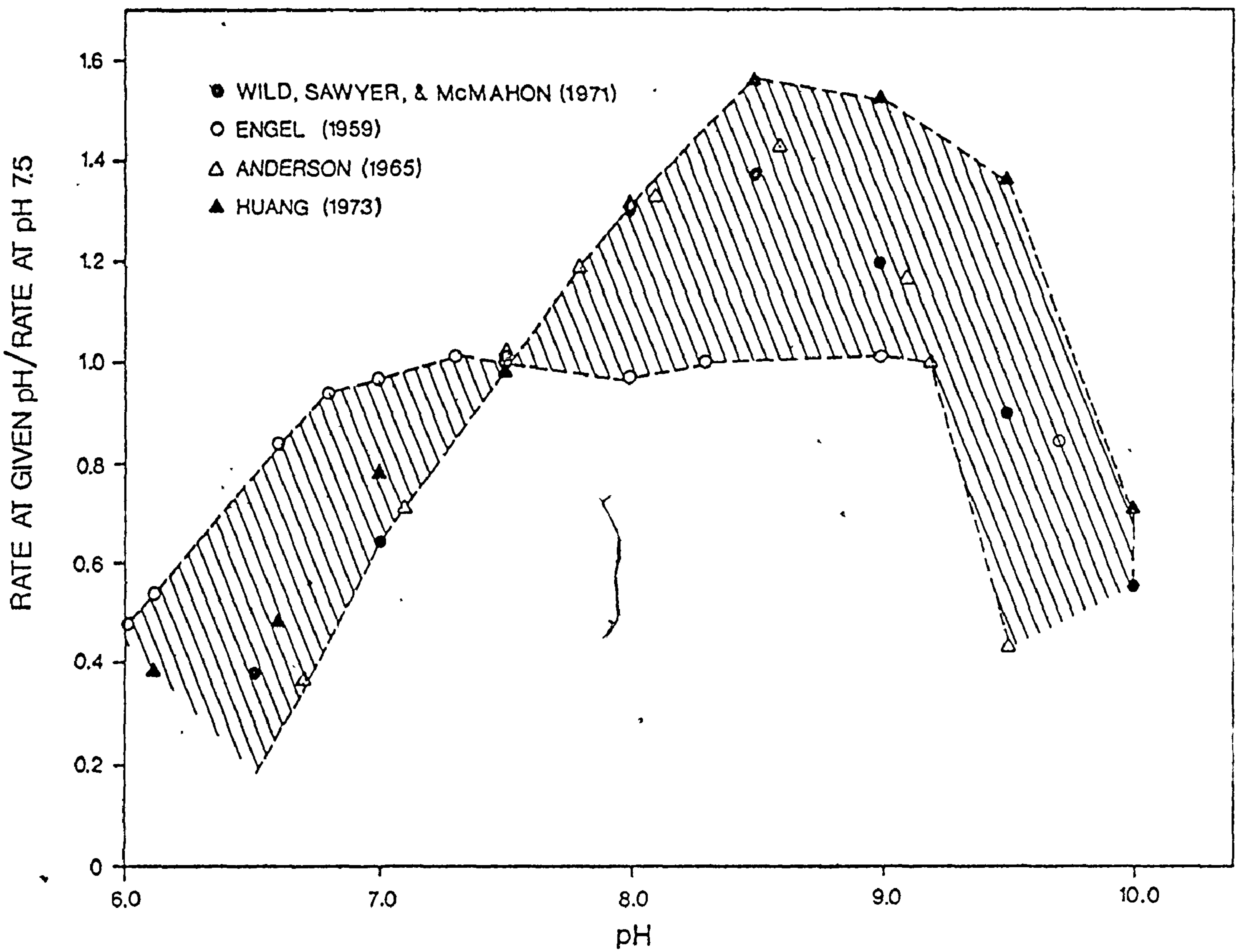


FIG. 2 EFFECT OF pH ON NITRIFICATION RATE

Nitrification is a hydrogen ion producing reaction (equation 1). Since pH values less than 6.0 would likely affect the nitrification rate the alkalinity of the waste is an important consideration. Assuming the pH is less than 8.5, the hydrogen ions produced during nitrification react with the bicarbonate in the wastewater, resulting in an increase in CO_2 concentration and a decrease in bicarbonate alkalinity according to:

$$H^+ + HCO_3^- \rightarrow CO_2 + H_2O \qquad \text{.........(10)}$$

Based upon equations 1 and 10, approximately 7 mg of bicarbonate alkalinity, expressed as $CaCO_3$, are required to neutralize the hydrogen ions produced during the oxidation of 1 mg of NH_4^+-N. Calculations involving carbonic acid equilibria show that for wastewater with an alkalinity of 200 mg/l as $CaCO_3$, approximately 20 mg/l of NH_4^+-N could be oxidized before the pH dropped below 6.0 if all the CO_2 produced remained in solution (Haug and McCarty, 1971). In most nitrifying reactors the CO_2 is stripped from solution tending to help maintain a neutral pH. In operating a rotating biological contactor for carbon (BOD) removal-nitrification of a municipal sewage with moderate alkalinity (approximately 120 mg/l as $CaCO_3$), Wilson (1975) found that 15 to 20 mg/l NH_4^+-N were nitrified and the pH was never less than 6.8.

The process of nitrification occurs over a range of approximately 4° to $45^{\circ}C$ with optima at about $35^{\circ}C$ for Nitrosomonas (Buswell, Shiota, Lawrence, and Meter, 1954) and 35° to $42^{\circ}C$ for Nitrobacter (Deppe and Engel, 1960, Laudelot and Van Tichelen, 1960). It has been shown to be strongly dependent on temperature. In a suspended growth nitrification system differences in the reported temperature sensitivity (Figure 3) may be due to differences in reactor SRT. Increasing SRT results in a decrease in the temperature sensitivity. Supported growth systems (trickling filter, rotating biological contactor, etc.), which could be expected to be operating at high SRT's, show reduced temperature sensitivity for nitrification (Wilson, Murphy, Sutton, and Jank, 1975, Huang, and Hopson, 1974).

Nitrifying organisms, especially Nitrosomonas, are susceptible to a number of inhibitors which may be present in municipal and industrial wastewaters. A number of metals are toxic to nitrifiers but the concentration required to cause inhibition is dependent on the state of the culture. Copper,

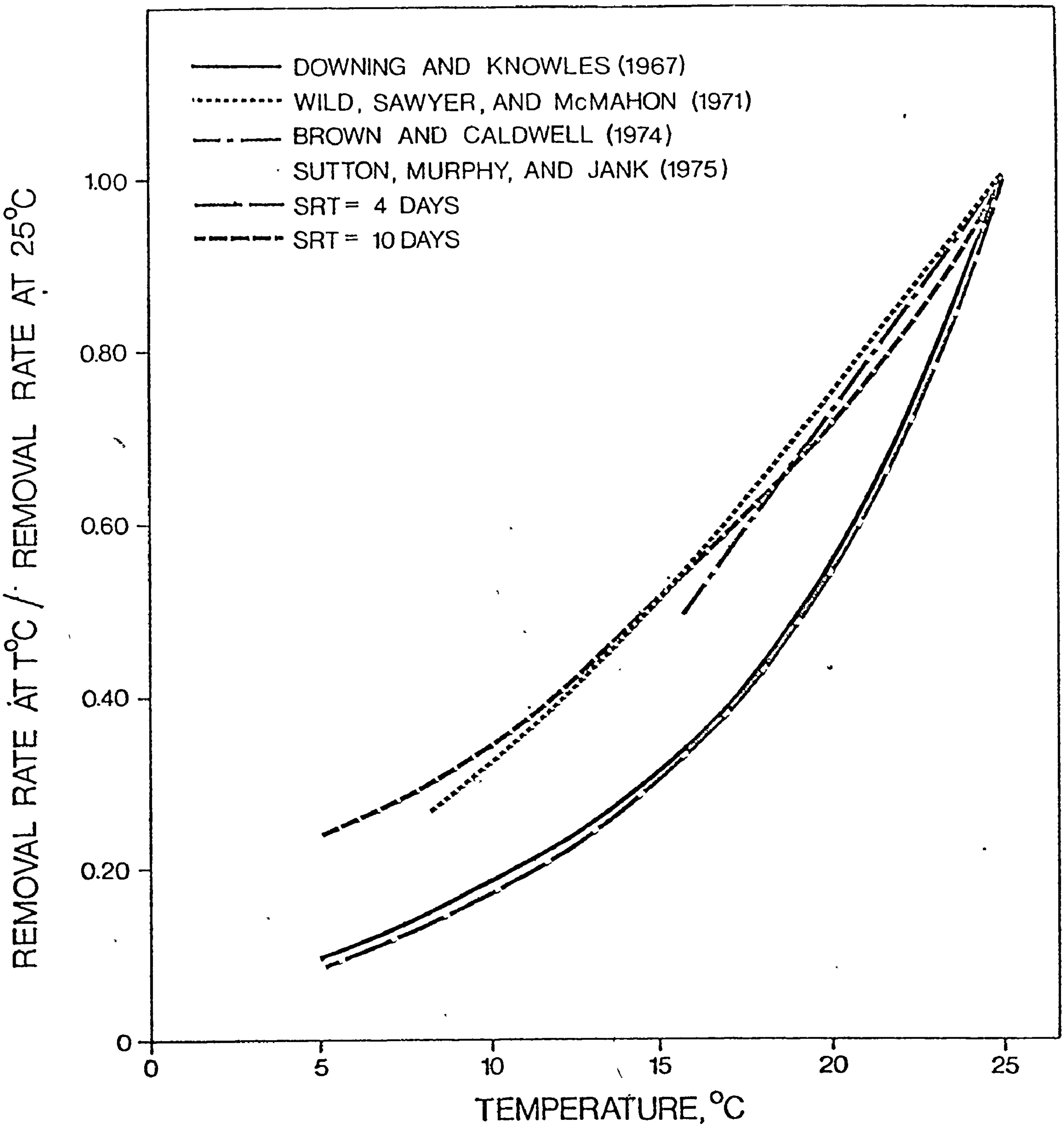


FIG. 3 EFFECT OF TEMPERATURE ON NITRIFICATION RATE

silver, mercury, nickel, chromium, and zinc all may inhibit nitrification under certain conditions. Downing, Tomlinson, and Truesdale (1964) identified a large number of organic materials which caused a reduction in nitrification rates in suspended growth systems. Thiourea, phenol, phenolic compounds, cresol, and halogenated solvents were some of the potential inhibitors identified. In screening the organic materials as nitrification inhibitors, unacclimated organisms were used and therefore the results may not reflect what actually would occur in a treatment plant.

Substrate and product inhibition has been reported for nitrification. Concentrations greater than 2500 mg/l nitrite-nitrogen have been found to inhibit Nitrosomonas (Meyerof, 1916, Lewis, 1959). At 1400 mg/l nitrite-nitrogen the growth of Nitrobacter has been affected (Boon and Laudelot, 1962). Such conditions are unlikely to be encountered in the treatment of municipal wastewaters but could occur in the treatment of nitrogenous industrial wastes.

Carbon Removal-Nitrification Treatment Alternatives

The process reactors available for carbon removal (BOD) - nitrification can be classified according to the nature of their biological growth. Activated sludge systems can be regarded as suspended growth reactors whereas systems in which growth occurs on, or within a solid media, can be termed supported growth reactors.

The two basic process schemes available for nitrification in the activated sludge process are the combined sludge process and the separate sludge process. In the combined sludge process, carbon removal and nitrification are carried out using the same sludge. In the separate sludge process, the biological reactions are carried out by different microorganisms in separate reactors.

A number of combined and separate sludge treatment plants have recently been designed to provide conditions for carbon removal and nitrification. Design has been based on criteria developed from studies during which wide variations and fluctuations in the nitrification efficiency were obtained. Mulbarger (1971), in the only intensive comparative experimental assessment of a combined and separate nitrification system to date, stated in reference to his experimental results that "Firm design and operational recommendations cannot be made at this time." Based on daily composite sampling and nearly steady flow of a municipal sewage, he did find that his combined sludge system failed to exhibit the same degree of soluble effluent TKN stability as the separate system. More recently Lawrence and Brown (1973) concluded that nitrified effluents of essentially identical quality could be produced from separate and combined sludge systems based on limited data from a pilot plant study.

Although nitrification has been obtained for many years in combined sludge systems similar to the configurations previously noted (Figure 1), the reported results indicate little more than conditions necessary to achieve nitrification. Furthermore, there are many contradictions in the literature regarding these conditions. Beckman, Avendt, Mulligan, and Kehrberger (1972) utilizing laboratory and full-scale treatment facilities found at 10^{o} to 18^{o}C, sludge ages greater than six days were required for optimum nitrification. Wuhrmann (1968) stated that at a temperature above 14^{o}C, a sludge age of two to three days will yield a stable nitrification system. Prakasam and Loehr (1972) found complete nitrification at sludge ages greater than three days in treating a high nitrogen strength poultry waste at 20^{o}C.

Several investigations have been made to determine the feasibility of nitrification in the separate sludge system. Wild, Sawyer, and McMahon (1971) studied batch nitrification in the separate sludge unit. A continuous nitrification unit operated under controlled conditions was used to provide sludge to conduct the batch studies on the effects of temperature and pH on the nitrification rate. Barth and Brenner (1968), operating at 185 gpd three-stage N removal pilot plant, obtained an average 87% conversion of reduced nitrogen compounds to nitrate in the separate nitrification stage. Operation was over a temperature range of 12^{o} to 22^{o}C and at an average solids retention time of 22 days.

Although optimization of separate sludge systems has not been performed to any great extent, as reflected by the wide variations in efficiency, the high values frequently obtained indicate the potential and encourage further research.

A limited number of supported growth systems have been utilized for carbon removal and/or nitrification including trickling filters, submerged aerobic filters, and rotating biological contactors.

PROCESS MODELLING FOR NITRIFICATION SYSTEMS

Pseudo "Steady-State" Modelling

Process design requires rate data to be expressed as parameters which are useful from an engineering point of view. In order to describe the substrate removal rate in any biological waste treatment process an overall kinetic expression compatible with the fundamentals of microbiology, kinetics, and transport phenomena is necessary.

For a given reaction environment, substrate removal rate is a function of the concentration of substrate (S) and active biological solids (X):

$$\frac{dS}{dt} = f(X,S),$$

$$\frac{dS}{dt} = KXS^{z}, \qquad \text{..........(11)}$$

where K is the substrate removal velocity, and the unit rate of substrate removal can be expressed as:

$$\frac{dS}{Xdt} = KS^{z} \qquad \text{...........(12)}$$

This normalization procedure has been used by numerous authors (Wuhrmann and Mechsner, 1965, Busch 1971), and in fact forms the basis for most engineering design work in biological treatment. Although strictly empirical the unit rate concept is fundamentally related to biological growth kinetics.

The relationship between substrate removal and biological growth can be expressed by:

$$\frac{dX}{dt} = Y\frac{dS}{dt} \qquad \text{............(13)}$$

where $\frac{dX}{dt}$ = net growth rate of microorganisms (M/T), and

Y = apparent yield coefficient.

Using the monod kinetic model to represent the kinetics of biological growth:

$$u = \frac{1}{X}\frac{dX}{dt} = \frac{u^*S}{Ks + S} \qquad \text{..........(14)}$$

where u = net growth rate (T^{-1}),

u*= maximum growth rate coefficient (T^{-1}),

S = substrate concentration (M/L^3), and

Ks= substrate concentration at one half maximum growth rate (M/L^3).

Combining equations 13 and 14:

$$\frac{1}{X}\frac{dS}{dt} = \frac{1}{Y}\frac{u^*S}{Ks + S} \qquad \text{..............(15)}$$

At low Ks values this expression becomes:

$$\frac{1}{X}\frac{dS}{dt} = \frac{u^*}{Y} = K \qquad \text{...............(16)}$$

Under such conditions the model is zero order independent of substrate concentrations. The zero order nature of the nitrification reaction, down to very low NH_4^+-N values, has been illustrated by numerous researchers (Wild, Sawyer, and McMahon, 1971, Huang, 1973, and Kiff, 1972). It is reasonable to anticipate that the reaction rate will be zero-order with respect to substrate concentration at all practical NH_4^+-N levels allowing the unit rate of removal to be expressed as a constant.

In order to relate the unit rate of ammonia removal to biological growth kinetics a measure of the active nitrifier population (X) is necessary. Techniques for determination of the autotrophic nitrifier fraction in a heterogeneous biological system are presently being developed (Srinath, Prakasam, and Loehr, 1974). The critical factors affecting the autotrophic-heterotrophic population dynamics in an activated sludge system are the solids retention time and influent wastewater organic carbon to inorganic nitrogen (C/N) ratio. Combined sludge systems operating under similar environmental conditions (reactor pH, dissolved oxygen and temperature) will contain the same number of nitrifiers at equal SRT's. Combined sludge systems operating under similar environmental conditions will contain the same fraction of nitrifiers at equal SRT's and influent wastewater C/N ratios.

In order to maintain consistent ammonia removal or nitrification under pseudo "steady-state" conditions the fractional increase in Nitrosomonas during aeration must be greater than or equal to the corresponding fractional increase in sludge age. The growth rate of Nitrosomonas and consequent rate of ammonia removal can be strong function of temperature. Knowles, Downing, and Barrett, (1965) claimed that the maximum specific growth rate of Nitrosomonas was increased by approximately 9.5 percent for each degree celcius increase in temperature. For many reactions, the variation of rate with temperature under pseudo "steady-state" conditions may be represented by an Arrhenius relationship. This relationship can be represented as:

$$K = Ae^{-E/RT}, \qquad \text{..............(17)}$$

where

K = reaction rate constant (day^{-1})

A = frequency factor (day^{-1})

E = activation energy (cal g-mole^{-1})

R = universal gas constant (cal g-mole^{-1} $^{o}K^{-1}$)

T = temperature (^{o}K)

Because temperature is a parameter that varies throughout the year in nearly every treatment plant, its effect on nitrification is important. In a particular operating alternative, the solids retention time may have to be significantly increased to compensate for low temperatures (i.e. below 10^{o}C). If a plant does not have this capability, nitrification may be partially or completely lost.

Dynamic Modelling

The effects of fluctuations in many variables on the dynamic behaviour of nitrification alternatives cannot be predicted from pseudo "steady-state" parameter values. A sudden rainfall may result in a hydraulic impulse to a treatment plant. Little insight into the expected profile of recovery and time to return to normal operation would be gained by examination of the pseudo"steady-state" process design parameters.

While dynamic models for the activated sludge processes have been and are being developed (Blackwell, 1971, Smith and Eilers, 1970), these models do not extend to systems for carbon removal-nitrification. In one study, Downing, Painter, and Knowles (1964) used batch nitrification data and computer techniques to model the time dependent results. Lijklema (1973) used a limited amount of steady-state literature data to substantiate his model for nitrification in a single-stage activated sludge process. Poduska (1973) presented the most extensive dynamic study of the nitrification process. Using a synthetic feed and bench scale apparatus, the transient responses of the nitrifying culture were investigated for various dynamic forcings at constant temperature. The dyanamic model developed considered only a single-stage system and did not account for the presence of heterotrophic bacteria and subsequent organic carbon degradation.

In assessing the effectiveness of the combined and separate sludge systems under non-steady operating conditions the variables of concern are fluctuations in hydraulic, organic, and inorganic loading, and variations in raw wastewater pH, and the temperature levels. By quantifying the effect of these variables an evaluation of the stability of the nitrification alternatives will be afforded.

The pseudo "steady-state" effect of temperature on many biological systems has often been represented by Arrhenius type expressions. These expressions could not be expected to predict the transitional or short term response to sudden changes in temperature. Similarly the transitional or short term response of biological systems to pH changes could not be expected to be predicted by pseudo "steady-state" expressions (Downing, and Knowles, 1967). Little or no information exists in the literature regarding transitional responses to changes in temperature and pH, on combined and separate sludge systems operated for carbon removal-nitrification.

When adequate experimental facilities are available, qualititative comparisons can be made between process alternatives. The wastewater feed can be varied in temperature and pH level, in organic and inorganic concentration, and in flow rate, and the resulting effluent response observed. Mathematical modelling and simulation, and conventional time series or spectral analysis are some basic tools by which process response can be interpreted quantitatively.

Deterministic dynamic models

The purpose of seeking a deterministic or mechanistic model is to allow an explanation for the response of a process to variations in the input variables. If such models can be determined for the combined and separate sludge carbon removal-nitrification alternatives, the response of the processes to input variables which cannot be examined experimentally due to equipment or time limitations, can be examined. Deterministic models nearly always have empirical qualities and it is unlikely that a system as complex as a biological wastewater treatment plant will ever be described exactly be a theoretical model.

Through consideration of the following an attempt can be made to develop a mechanistic model for the activated sludge process, operated for nitrification:

1) the flow regime in the aeration basin,
2) the oxygen requirements of the system,
3) the representation of the performance of the final settler,
4) the effect of secondary parameters such as wastewater temperature, pH, and toxic substances,
5) the form of the equation expressing the time rate of synthesis of substrate into new cells, and
6) such factors as cell lysis, basal metabolism, and solubilization of particulate degradable organic carbon.

In modelling, the separate and combined sludge systems described here (Figure 1) ordinary differential equations are used to express the dynamic behaviour of each of the following: heterotrophs, Nitrosomonas, Nitrobacter, degradable organic carbon, ammonia nitrogen, nitrate nitrogen, and nitrite nitrogen. It is assumed that all the heterotrophic organisms can be represented by a characteristic organic carbon substrate utilization rate described by a linear correlation. The available carbon substrate is that measured as filterable degradable organic carbon. Substrate utilization by the nitrifying bacteria is assumed to follow Monod kinetics. One of the powerful advantages of Monod kinetics is that it is a continuous function reducing to first order at low substrate concentrations and approaching zero order at high substrate concentrations. One inherent weakness of the Monod function often sited (Powell, 1967) is that it shows the growth rate to be only dependent on the instantaneous substrate concentration exhibiting no lag in response to changes in concentration. The lag in growth rate exhibited by nitrifying bacteria for changes in ammonia and nitrite concentrations has been shown by Hofman and Lees (1953), Lees and Simpson (1957), and Laudelot and Van Tichelen (1960) to be very small.

In the expressions for the growth rate and consequent substrate utilization equations, no account will be given for variations in dissolved oxygen (DO), temperature or pH. The parameter values in these equations will be assumed constant reflecting constant DO, temperature, and pH.

In the organism material balances, reduction in cell growth due to lysis or endogeneous respiration is represented by a combined decay coefficient for each of the organism groups involved.

While, in developing the dynamic models, no attempt will be made to express the kinetic growth coefficients as functions of the transient loading condition, this assumption, as applied to the yield coeffficient for heterotrophs, is questionable and a relation expressing the variation with loading may be necessary (Smith and Eilers, 1970). The small yield values reported for nitrifiers (Painter, 1970) makes any correction for ammonia and nitrite loading unnecessary. Similarly the insignificant yield value for Nitrosomonas allows the neglection of the small amount of ammonia used in cell synthesis that does not appear as nitrite. The remaining coefficients, the linear coefficient describing heterotrophic growth and the maximum growth rate and saturation coefficients in the Monod models for nitrification, will be assumed constant over a given transient period. Providing the dynamic investigations involve relatively short term temporal periods, the possibility for changes in these parameters should be small.

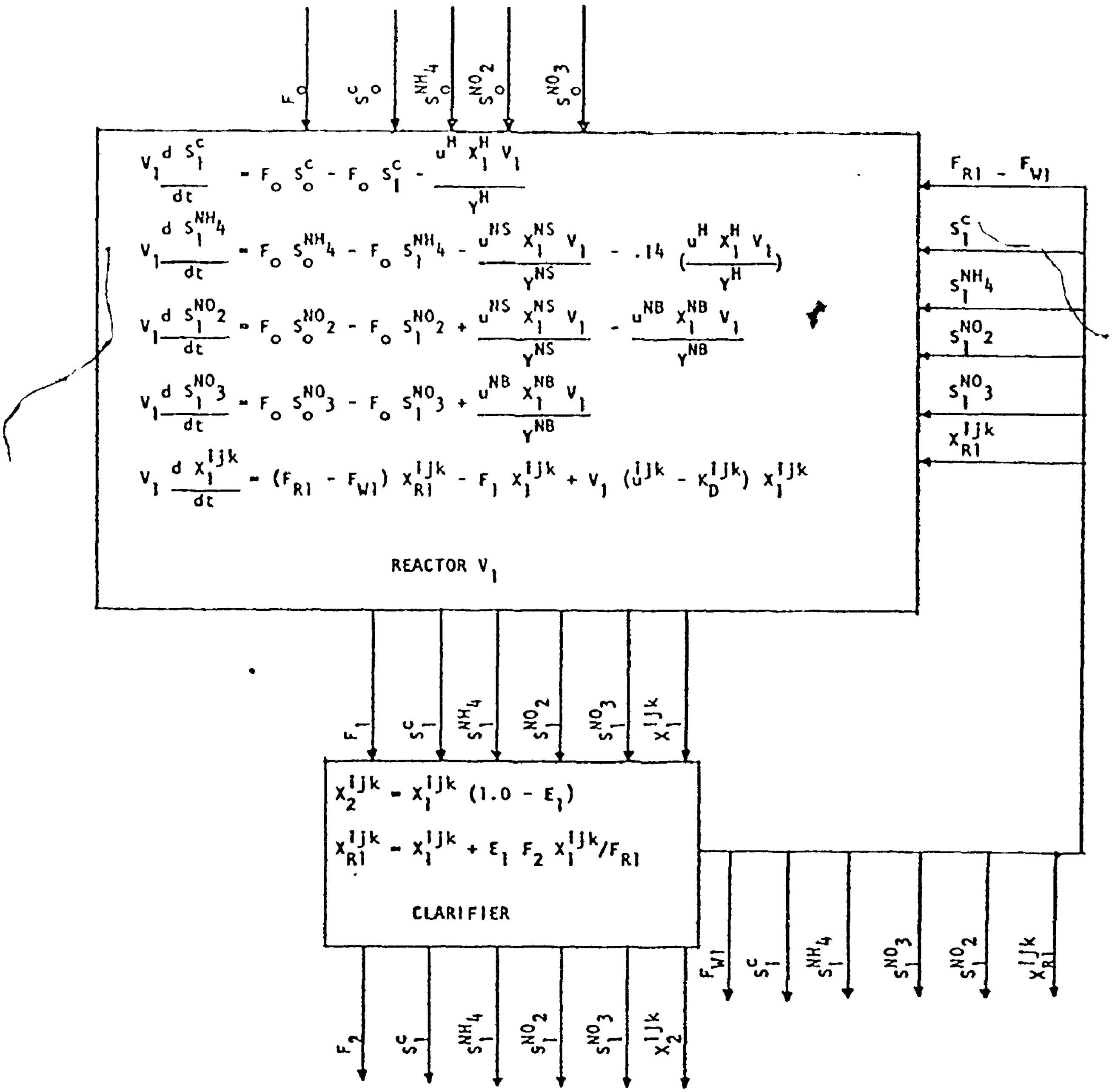
In the initial model development, each aerator will be assumed completely mixed. Residence time distribution studies, may indicate that a different hydraulic model is necessary.

An adequate representation of the performance of the final settler is a complication in any model for the activated sludge system. Since the interactions between the aeration basin and the solid-liquid separators are not of prime importance in this research, we will consider the settlers to be zero volume devices whose efficiency can be described by a separation coefficient determined experimentally. No bacterial growth or changes in organic carbon, ammonia, nitrite, and nitrate are assumed to occur in the settler and the return flow and effluent streams contain equal proportions of all biological groups.

The dynamic model describing the single-stage combined sludge carbon removal-nitrification alternative is represented in Figure 4. In this figure:

V = volume of reactor (L^3),
F = flow rate (L^3/T),
S = limiting substrate concentration (M/L^3),
X = organism concentration (M/L^3),
0,1,2,3,4,R1,W1 = notations which relate to flow streams,
H,NS, NB = notations which relate to heterotrophs, _Nitrosomonas_, and _Nitrobacter_, and
C,NH_4,NO_2,NO_3 = notations which relate to filterable degradable organic carbon, ammonia, nitrite, and nitrate.

In the model development, substrate and organism material balances are presented assuming the nitrification reactions follow the stoichiometric equations 1 and 2 and the general material balance for completely mixed reactors applies:



i, j, k - represent heterotrophs, Nitrosomonas, and Nitrobacter

FIG. 4 MODEL RELATIONSHIPS FOR SINGLE-STAGE COMBINED SLUDGE SYSTEM

rate of material accumulation	=	rate of material flow into reactor	-	rate of material flow out of reactor	±	rate of appearance or disappearance of material due to growth or utilzaation by organisms.

Details concerning the material balances are presented in Appendix A.

Similar models involving substrate and organism balances can be developed for the TSC and TSS sludge systems.

Before the equations which comprise the proposed dynamic models can be solved, values for the various parameters must be determined. Methods are discussed in Appendix A for determining the parameter values.

Having developed a dynamic mathematical model, the equations which comprise the model must be solved in order to predict behaviour with respect to time. Simulation packages which can be used in solution of the differential and algebraic equations comprising the dynamic models include DYNSYS AND CSMP. DYNSYS is a modular dynamic system simulation developed by A.I. Johnson and associates at McMaster University. Using this modular routine, a particular process can be simulated by assembling a number of modules representing the individual processes within the plant. Both differential and algebraic equations can be handled. CSMP (IBM, 1972) is an equation oriented approach differing from the modular approach in that equations are not integrated one at a time but simultaneously. CSMP is highly user oriented allowing concentration on model development and simulation results rather than on details of the computations.

Linear dynamic stochastic models

The activated sludge system is a heterogeneous culture system containing a wide spectrum of organisms interacting and competing for the many organic and inorganic substrates. In describing the single-stage combined sludge (SSC) carbon removal-nitrification alternative, the heterogeneous system was simplified by considering independent organism groups growing on defined substrates. A number of other assumptions are inherent in the model development to reduce the complexity of the process including:

1) the neglection of synergism or antagonism resulting from organism and substrate interaction,

2) the utilization of empirical functions to describe biological growth and consequent substrate removal,

3) the neglection of any lag in growth rate exhibited by both autotrophic and heterotrophic organism groups in response to changes in substrate concentration.

4) the assumption that kinetic growth coefficients are constant, unaffected by variations in loading conditions to the treatment plant, and variations in D.O., temperature, and pH within the aeration basin, and

5) the neglection of the effect on substrate removal of any physical-chemical mechanisms such as adsorption.

It is apparent that the highly complex nature of the activated sludge process makes it most unlikely that a "true" unified model, allowing extrapolation of process performance from one system to another, could be developed. The obscure, undefined processes will lead to output results not accountable by the model. Even if the proposed model for the SSC activated sludge system, with its stated weaknesses, was sufficient to describe the carbon removal-nitrification performance, there results a considerable number of time dependent growth and substrate removal functions complicating the usefullness of the model.

When dealing with systems that do not behave according to a relatively simple deterministic model and are complicated by unexplainable output variation or noise it may be more useful to utilize linear dynamic-stochastic models. The activated sludge system may well tend to act as a linear system because of a central limit or averaging effect of the many growth and substrate removal functions controlling the process. Consequently, linear transfer function models should describe the time-dependent behaviour adequately. Such models, together with linear time series models to account for the unexplained output variations, can be used to describe the response of the combined and separate sludge systems to input variations.

It is accepted that the levels of the inputs, such as concentration of NH_3-N and organic carbon to the alternative carbon removal-nitrification systems (Figure 1) will result in a delayed response in the output levels. Such a change is referred to as a dynamic response and a model describing this dynamic response is referred to as a transfer function model.

These models are of the form:

$$Y_t = \Sigma_{i=1} \frac{(\omega_0 - \omega_1 \beta \ldots - \omega_{s_i} \beta^{s_i})}{(1 - \delta_1 \beta \ldots - \delta_{r_i} \beta^{r_i})} X_{i,t-b} \qquad \ldots\ldots\ldots\ldots\ldots(18)$$

$$= \Sigma_{i=1} V_i(\beta) X_{i,t-b}$$

where
- Y_t = output deviation from the mean at time t,
- ω, δ = model parameter values,
- r, s = model orders
- b = delay period,
- X_{it} = the deviation from the mean of the i^{th} variable at time t,
- β = backward shift operator, and
- $V_i(\beta)$ = discrete transfer function model relating Y_t and $X_{i,t}$

Other influences which affect the output levels, referred to as noise, can be taken into account by a noise model:

$$N_t = \frac{(1 - \theta_1 \beta \ldots - \theta_q \beta^q)}{(1-\beta)^d (1 - \phi_1 \beta \ldots - \phi_p \beta^p)} a_t \qquad \ldots\ldots\ldots\ldots\ldots(19)$$

where
- N_t = disturbance in the output due to all sources other than the X_{it}'s
- θ, ϕ = model parameter values,
- p, d, q = model orders, and

a_t = a white noise sequence (independent random variables).

Therefore, the combined transfer function-noise (TF-N) model can be written:

$$Y_t = \sum_i V_i(\beta)\, X_{i,t-b} + N_t \qquad \ldots\ldots\ldots\ldots\ldots(20)$$

The building of these models is accomplished by an iterative procedure involving:

1) identification of the transfer model polynomial orders (r_i, s_i i=1, 2...) and delay period (b),
2) estimation of the parameters of the tentatively identified transfer function model,
3) identification of the noise model,
4) re-estimation of the parameters of the combined transfer function-noise model, and
5) diagnostic checking of the fitted model to verify adequacy.

In the identification stage of the transfer function model building sequence, cross correlation techniques may be used to indicate r,s, and b and estimate the impulse response values (V_i) of the transfer function model. The cross correlation function between two input-output series (x and y) separated by a constant interval or lag (k) is given by:

$$\rho_{xy}(k) = \frac{\gamma_{xy}(k)}{\rho_x \rho_y} \qquad k = 0, \pm 1, \pm 2 \ldots \qquad \ldots\ldots\ldots\ldots(21)$$

where $\gamma_{xy}(k)$ = cross covariance function between x and y, and

ρ_x and ρ_y = constant standard deviations of the x and y series.

Determination of the cross correlation functions also allows a preliminary assessment of which input and output characteristics are most related.

In place of using cross correlation techniques to estimate the V_i values of the transfer function model, they can be determined directly through a relationship with the autocovariance function of the input series and the cross covariance function between the input-output series (Box and Jenkins, 1970a). Once V_i values are obtained, preliminary estimates for the model parameters (ω,δ) can be determined through use of an identity to equation 18 (Box and Jenkins 1960b). Beginning with the preliminary estimates, an efficient estimation procedure is used such as non-linear least squares to determine the parameter values.

The noise component of the combined TF-N model is identified by examining the residuals of the transfer function model using autocorrelation techniques.

Once diagnostic checking has varified the adequacy of the fitted model, it is possible to forecast future values of the output series Y_{t+i} using X_t as a leading indicator. This is accomplished by using the "difference" form of the combined TF-N model (Box and Jenkins, 1970c).

EQUIPMENT AND PROCEDURES

Pilot Plant Design and Operation

To evaluate the combined and separate sludge carbon removal-nitrification alternatives a pilot plant was designed by P.M. Sutton and K.L. Murphy and constructed at the Wastewater Technology Centre, Burlington, Ontario by Sutton and members of the pilot plant staff of the Environmental Protection Service. This facility, designed for a maximum hydraulic loading of 32.7 m^3/day (7,200 Igpd), permits study of both suspended and supported growth carbon removal-nitrification systems (Figure 5).

The suspended growth systems for carbon removal-nitrification, designated as plants A and B,consists of two 2.81 m^3 (480 Ig) plexiglass, dispersed air aeration tanks. Plant A contains a removable divider allowing either the two-stage or the single-stage combined sludge system (TSC or SSC) to be operated in parallel with Plant B. Plant B forms the two-stage separate sludge system (TSS), a fixed divider separating the reactor into two aeration tanks (B1 and B2). Three additional removable dividers were added to Plant B when required to form a five-stage combined sludge system (FSC). The circular clarifiers are 0.76 m (2.5 ft) in diameter providing a surface settling rate of 28.9 $m^3/day/m^2$ (590 $Igpd/ft^2$) and a hydraulic detention time of 1.0 hr at a feed rate of 9.1 l/min (2.0 Igpm).

Variable speed positive displacement pumps deliver the wastewater to the reactors from a cooling unit capable of cooling to 3^oC or heating to 25^oC with a precision of $\pm 1^oC$. The biological solids retention time is controlled in the reactors by wasting from return sludge lines.

By control of the SRT and temperature, a pseudo "steady-state" operation point was approached. Using 24 hr time-averaged sampling, and parallel operation, the performance of any two alternatives could be assessed. In order to determine the kinetic removal rates used to describe the pseudo "steady-state" performance of the nitrification systems, the effluent from the reactors must contain residual filterable ammonia. When complete ammonia conversion was obtained, additional amounts of ammonia (NH_4Cl) were added as the nitrification rate was considered to be substrate

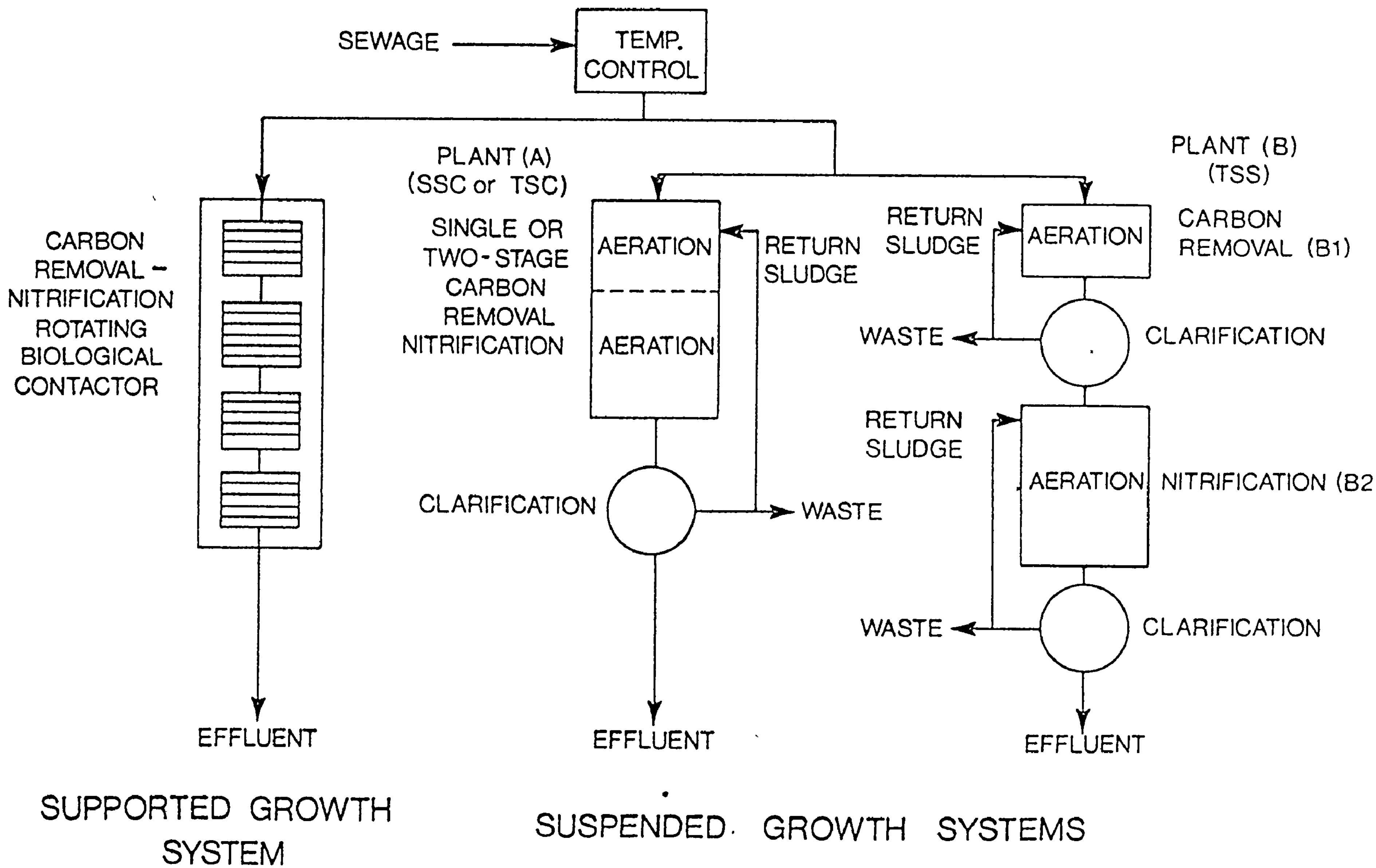


FIG. 5 SUSPENDED AND SUPPORTED GROWTH CARBON REMOVAL - NITRIFICATION PILOT PLANT

limited at effluent NH_4^+-N values less than 1.0 mg/l. Bicarbonate ($NaHCO_3$) was added to the feed when necessary to avoid any alkalinity limitation on the ammonia removal rates. The dissolved oxygen in the reactors was maintained above a minimum level of 2.0 mg/l.

To assess the dynamic behaviour of the carbon removal-nitrification alternatives, the input variables had to be artificially disturbed. The degritted raw municipal wastewater pumped from the Burlington Skyway treatment plant contained normal diurnal variations in organic and inorganic concentrations (Table 2). The pilot plant variable speed pumps provided a means of delivering the wastewater to the reactors in any hydraulic pattern. This, together with supplementing the wastewater with organic carbon (dextrose) and inorganic nitrogen (NH_4Cl), allowed any combination of hydraulic, organic, and inorganic loading to be obtained.

Experimental Plan

The pilot plant program was divided into four phases covering the period from May 1973 to June 1975. Phase 1 consisted of the design and construction of the pilot plant facilities extending from May until October, 1973.

Start-up of facilities and preliminary experiments constituted Phase 2. Initially mixed-liquor suspended solids from the Burlington Skyway activated sludge plant were added to the aeration sections of Plants A and B (Figure 5) and continuous operation began immediately. The preliminary experiments which followed determined the operating limitations of the carbon removal-nitrification alternatives, allowing formulation of a concise experimental program designed to compare the systems under pseudo "steady-state" conditions. This experimental period designated Phase 3 extended from November 1973 until February, 1975. During Phase 3 preliminary non-steady and variable loading experiments were conducted.

Phase 4 concluded the experimental program and involved experiments designed to assess and compare the dynamic behaviour of the carbon removal-nitrification systems. During this phase, additional pseudo "steady-state" experiments were completed.

TABLE 2 RAW WASTEWATER CHARACTERISTICS

Characteristic mg/l	Mean	90%*
COD	325	460
BOD_5	120	200
Filterable Organic Carbon (FOC)	28	37
SS	240	450
Filterable NH_4-N	15	18
Filterable TKN	17	25
Alkalinity (as $CaCO_3$)	118	130

Note: *90% of observations are equal to or less than stated value

Pseudo "steady-state" experimental design

The primary factors considered to affect the pseudo "steady-state" performance of the nitrification alternatives in treating municipal wastewater were the solids retention time (SRT) or sludge age and temperature. Three levels of system SRT and five levels of temperature were selected (Table 3). The SRT levels were determined on the basis of practical design considerations for full scale facilities. The temperature levels reflect values under which treatment plants may operate in continental climates.

The system SRT was determined by a combination of hydraulic residence time and intentional solids wasting. Details concerning the calculation of the system SRT for each alternative appear in Appendix B. The experimental design, formulated to compare the operating alternatives (Table 4), allowed for a complete assessment of the two-stage separate sludge system (TSS) and a comparative assessment, through statistical methods, of the other alternatives (TSC and SSC). Additional pseudo "steady-state" experiments were undertaken to increase the precision of certain design parameter values derived for each alternative.

Pseudo "steady-state" was achieved by operating the reactors at the predetermined levels of SRT and temperature. After a sufficient period for temperature acclimation (Benedict and Carlson, 1973) and a minimum time of one and normally two or three system SRT's, the performance of the operating systems was assessed.

Non "steady-state" experimental design

To assess the dynamic behaviour of the combined and separate sludge systems, the parallel TSC and TSS systems were subjected to a variety of non-steady conditions (Table 5). Previous to each experiment the systems were operated at solids retention times of three to four days and at a temperature of approximately 15^{o}C, conditions critical for nitrification, to ensure measurable responses would be observed. To assess the effect of hydraulics on combined sludge systems operated for carbon removal-nitrification under non-steady conditions the single-stage system (SSC) was compared to the five-stage system (FSC) in experiment D9 (Table 5).

TABLE 3 EXPERIMENTAL DESIGN LEVELS

Factor	Operating Value	Design Level
System Solids Retention Time days	4	-
	7	0
	10	+
Temperature °C	5	1
	10	2
	15	3
	20	4
	25	5

TABLE 4 EXPERIMENTAL DESIGN FOR SYSTEM COMPARISON

Run No.	Temperature Level	System Solids Retention Time Level		
		Single-Stage Combined (SSC)	Two-Stage Separate (TSS)	Two-Stage Combined (TSC)
PSS-15	1		+	+
-17			0	0
-01		0	0	
-08		-	-	
PSS-11	2		-	-
-21			0	0
-20		0	0	
-57		+	+	
PSS-13	3		+	+
-23			0	0
-25		0	0	
-29		-	-	
PSS-44	4		-	-
-31			0	0
-34		0	0	
-16		+	+	
PSS-54	5		+	+
-53			0	0
-52		0	0	
-61		-	-	
Repeats				
PSS-07	1	-	-	
-14	1		+	+
-59	2		+	+
-58	2	-	-	
-12	3		-	-
-60	3	+	+	
-63	4		+	+
-49	4		-	-
-62	5		-	-
-55	5	+	+	

TABLE 5 NON "STEADY-STATE" EXPERIMENTS

Run No.	Baseline Conditions Temp. °C	Baseline Conditions Hydraulic Detention Time (Aeration) hrs	Run Length days	Experiment
D1	15	8	5	Step down in temperature of 5°C.
D2	15	8	8	pH impulse (HCl).
D3	15	8	4	Hydraulic impulse 2x baseline level for 10 hrs (24-34 hrs).
D4	15	8	4	Hydraulic, plus OC, plus inorganic N impulse 2x mean levels for 10 hrs (24-34 hrs).
D5	14	8	10	Designed changes in hydraulic, OC, and TKN levels.
D6	13	8	4	Hydraulic step 2x baseline level.
D7	13	8	4	OC step addition of 40 mg/l C to normal levels.
†D8	13	8	4	Inorganic N step addition of 15 mg/l N to normal levels.
*D9	20	8	3	Hydraulic, plus OC, plus inorganic N impulse 2x mean levels for 10 hrs (24-34 hrs).

Note: *SSRT 2-3 days in SSC and FSC systems.
†SSRT 6 days in TSS system.

The high degree of correlation between the input variables, typical of the daily input to wastewater treatment plants, made it necessary to artificially disturb the inputs in a designed manner in order to properly assess their individual effects. Two levels of flow rate, filterable organic carbon, and filterable TKN were chosen (Table 6) and an experimental design formulated (Table 7). During this experiment (D5) the temperature and system SRT conditions were maintained at the baseline conditions.

Sample Preparation and Analyses

Samples for organic carbon were prepared by filtration through 0.45 micron Gelman glass fiber filters followed by acidification to pH 2 with concentrated hydrochloric acid. Unfiltered TKN and COD samples were acidified with concentrated sulphuric acid. NO_3^--N, NO_2^--N, filtered TKN, NH_4^+-N and COD samples were prepared for analyses by filtration through 0.45 micron Gelman glass fiber filters. All samples were stored at 0^o to 5^oC in polyethylene bottles while awaiting analyses except for BOD samples which were frozen.

The analytical procedures utilized are detailed in Appendix B.

TABLE 6 EXPERIMENT D5 DESIGN LEVELS

Influent Factors	Operating Value	Design Level
Flow Rate	9.0	+
l/min	4.6	-
Filterable OC	30 - 40	+
mg/l	10 - 20	-
Filterable TKN	20 - 30	+
mg/l	5 - 15	-

TABLE 7 EXPERIMENT D5 DESIGN

Time Period hrs	Flow Rate Level	Filterable OC Level	Filterable TKN Level
24 - 36	+	+	+
0 - 12	-	+	+
84 - 96	+	-	+
36 - 48	-	-	+
12 - 24	+	+	-
60 - 72	-	+	-
48 - 60	+	-	-
72 - 84	-	-	-
96 - 120	-	+	-
120 - 144	+	+	-
144 - 168	-	-	+
168 - 192	+	-	+
192 - 204	-	+	-
204 - 216	+	-	-
216 - 228	-	-	-
228 - 240	+	+	-

DISCUSSION OF RESULTS

Pseudo "Steady-State" Behaviour

Appendix B contains a computer listing of the complete day to day operating and analytical results during each phase of the experimental plan. The results of experiments, designed to compare the separate and combined sludge systems (Table 4), are tabulated in Appendix C (Table C1). Included are the results of other pseudo "steady-state" experiments undertaken to increase the precision of the derived design parameter values. Any experiments repeated, at equal SRT and temperature conditions are considered "genuine" repeats (Appendix C).

Evaluation of combined and separate sludge systems

The three carbon removal-nitrification systems were compared first in terms of their ability to remove filterable TKN. The results from the analysis of paired data over a system sludge age range of four to ten days and temperature range of 5^{0} to 25^{0}C using a "t-test" indicated comparable removal of filterable TKN by the separate (TSS) and combined sludge systems (TSC and SSC) at equal system solids retention times. While the data might appear to favour the separate sludge system (Figure 6), a "t" value less than the critical value (95% level) for the differences (Di values) in effluent TKN is indicated in Table 8. The lack of interaction between the differences in filterable TKN removal of the parallel operating systems and the solids retention time and temperature allowed the paired data to be statistically analysed as one data set.

The paired data from the operation of the TSS sludge system in parallel with either the SSC or TSC sludge system allowed a straight forward statistical assessment. In comparing the two combined sludge systems (SSC and TSC) such a procedure was not possible. The mean differences in treatment between the SSC and TSS sludge system and the TSC and TSS sludge system were determined. The two mean values were examined statistically to determine if they were significantly different from each other. Normal statistical procedures assume the populations from which the two means were derived, have equal variances. In this instance,

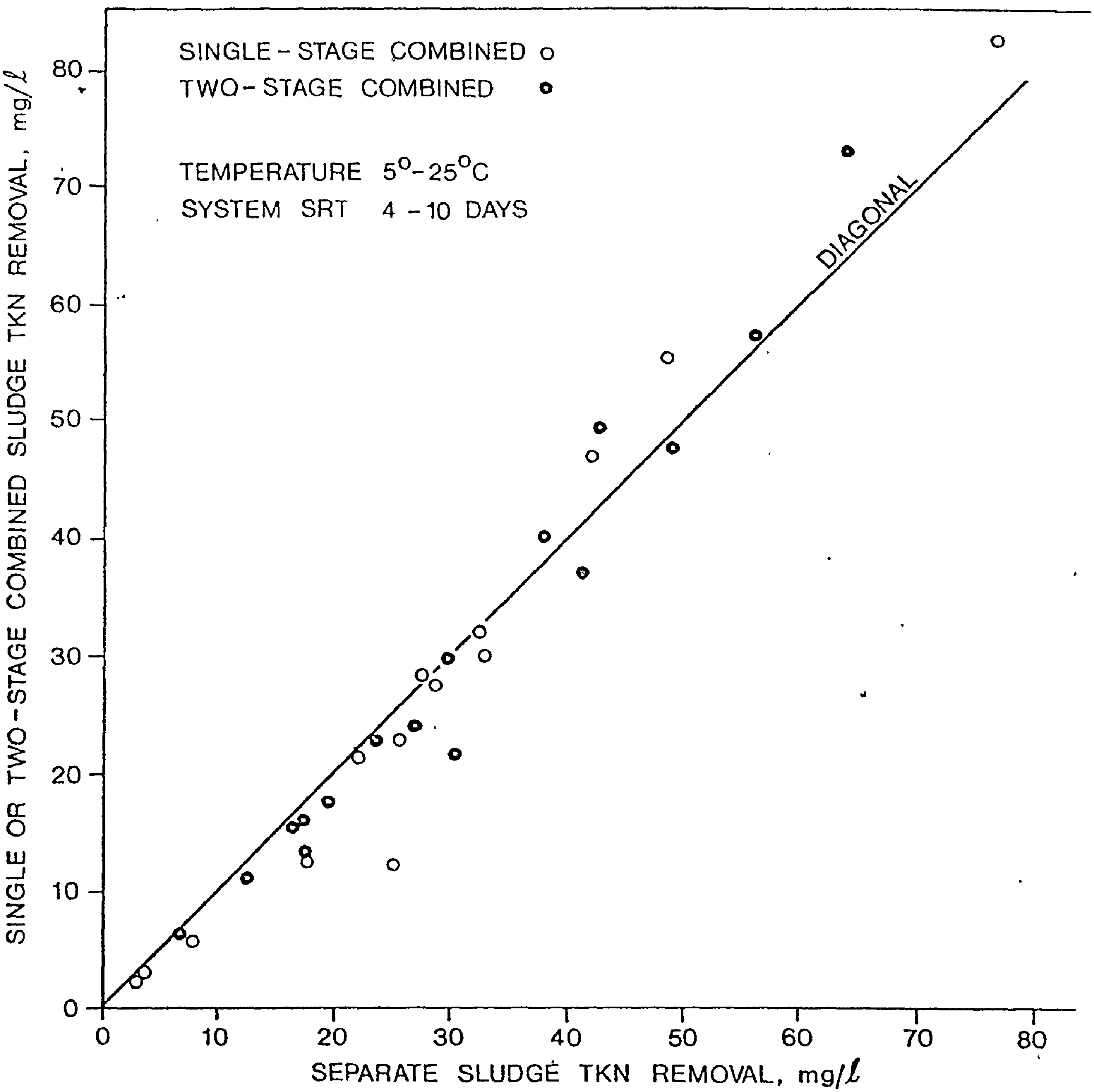


FIG. 6 FILTERABLE TKN REMOVAL IN COMBINED AND SEPARATE SLUDGE SYSTEMS

TABLE 8 DIFFERENCE IN EFFLUENT RESULTS FROM PARALLEL OPERATING SEPARATE AND COMBINED SLUDGE SYSTEMS

Parameter mg/l	$\bar{D}$	S_D^2/n	t	t α=.95	t α=.99
TSS vs SSC					
Filterable TKN	-0.06	0.87	0.06	1.77	2.65
$NO_3 + NO_2$-N	1.47	1.43	1.23	1.81	2.76
SS	5.85	27.45	1.12	1.78	2.68
Alkalinity (as $CaCO_3$)	1.79	10.32	0.54	1.78	2.68
TSS vs TSC					
Filterable TKN	0.51	1.09	0.49	1.75	2.60
$NO_3 + NO_2$-N	0.33	0.66	0.41	1.76	2.62
SS	10.50	35.61	1.76	1.75	2.60
Alkalinity (as $CaCO_3$)	2.87	21.90	0.61	1.76	2.62

Note: $\frac{S_D^2}{n}$ = estimated variance of $\bar{D}$, where

$S_D^2 = \frac{\Sigma(D_i-\bar{D})^2}{n-1}$, and

$\bar{D}$ = mean difference in effluent parameter value (separate-combined sludge value),

n = number of paired data points, and

$t = \frac{\bar{D}}{S_D/(n)^{1/2}}$.

the ratio of the variances when compared to the "F" statistic indicated that such an assumption was warranted (Table 9) and allowed the use of a "t-test" for the comparison of the means. The resulting "t" value was not significant implying that equal filterable TKN removal was obtained with both SSC and TSC sludge systems (Table 9). This allows an evaluation of the effect of reactor configuration on nitrification. The use of dye studies to approximate the hydraulics of the systems (Appendix D) indicated that the single-stage reactor could be considered a completely mixed system characterized by a large value of the dimensionless dispersion parameter D/uL. The mixing regime in the TSC sludge system can be approximated by a value of D/uL equal to 0.2, closer to conditions characteristic of full-scale basins with large length to width ratios. The results and a summary of the procedures used in conducting the dye studies is presented in Appendix D. The lack of difference in filterable TKN removal in the two combined sludge systems (Table 9), with substantially different mixing regimes, supports the "zero-order" nature of the nitrification reaction down to very low filterable TKN or NH_4^+-N values. This lack of concentration dependency is further demonstrated in Appendix C (Table C, Figure C1).

In biological wastewater treatment plants designed for nitrogen conversion and removal, denitrification will normally follow the nitrification process. An important variable in design of denitrification systems is the influent nitrate concentration. The paired data analysis indicated that the alternative carbon removal-nitrification systems will produce equal amounts of $NO_3^- + NO_2^-$-N (Tables 8 and 9). The nitrate production will be 0.8 g of $NO_3^- + NO_2^-$-N per gram of filterable TKN removed (Figure 7). The NO_2^--N concentration in the reactor effluents will normally be less than 1.0 mg/l (Figure 8).

The hydrogen ions produced during nitrification, react with the bicarbonate in the wastewater resulting in a decrease in alkalinity. The analysis of paired data indicated that the SSC and TSC, and TSS sludge systems consumed equal amounts of alkalinity during the nitrification reaction (Tables 8 and 9). The geometric and arithmetic mean values for the consumption ratio are 3.3 and 3.9 grams of alkalinity (as $CaCO_3$) consumed per gram of filterable TKN removed (Figure 9) considerably less than the theoretical value of approximately 7. The theoretical value assumes that no filterable TKN is used for assimilation of heterotrophic

TABLE 9 DIFFERENCE IN EFFLUENT RESULTS FROM TSC AND SSC SLUDGE SYSTEMS

Parameter mg/l	System Compared to TSS	$\bar{D}$	S_D^2	$\frac{S_{D1}^2}{S_{D2}^2}$	F α =.95	t	t α =.95
Filterable TKN	SSC TSC	-0.06 0.51	12.19 17.46	1.43	3.05	0.40	2.05
$NO_3 + NO_2$-N	SSC TSC	1.47 0.33	15.73 9.92	1.59	3.15	0.41	2.06
SS	SSC TSC	5.85 10.50	356.97 569.73	1.60	3.18	0.57	2.05
Alkalinity (as $CaCO_3$)	SSC TSC	1.79 2.87	144.48 328.55	2.27	3.08	0.19	2.05

Note:

$$S_D^2 = \frac{\Sigma(Di-\bar{D})^2}{n-1}$$

n = number of paired data points

$$t = \frac{\bar{D}_{TSC}-\bar{D}_{SSC}}{Sp\left(\frac{1}{n_{TSC}} + \frac{1}{n_{SSC}}\right)^{\frac{1}{2}}}$$ where,

Sp^2 = pooled variance for $D_{TSC}-D_{SSC}$, and

$$Sp^2 = \frac{n_{TSC}\,(S_{D\,TSC}^2) + n_{SSC}\,(S_{D\,SSC}^2)}{n_{TSC} + n_{SSC}}$$

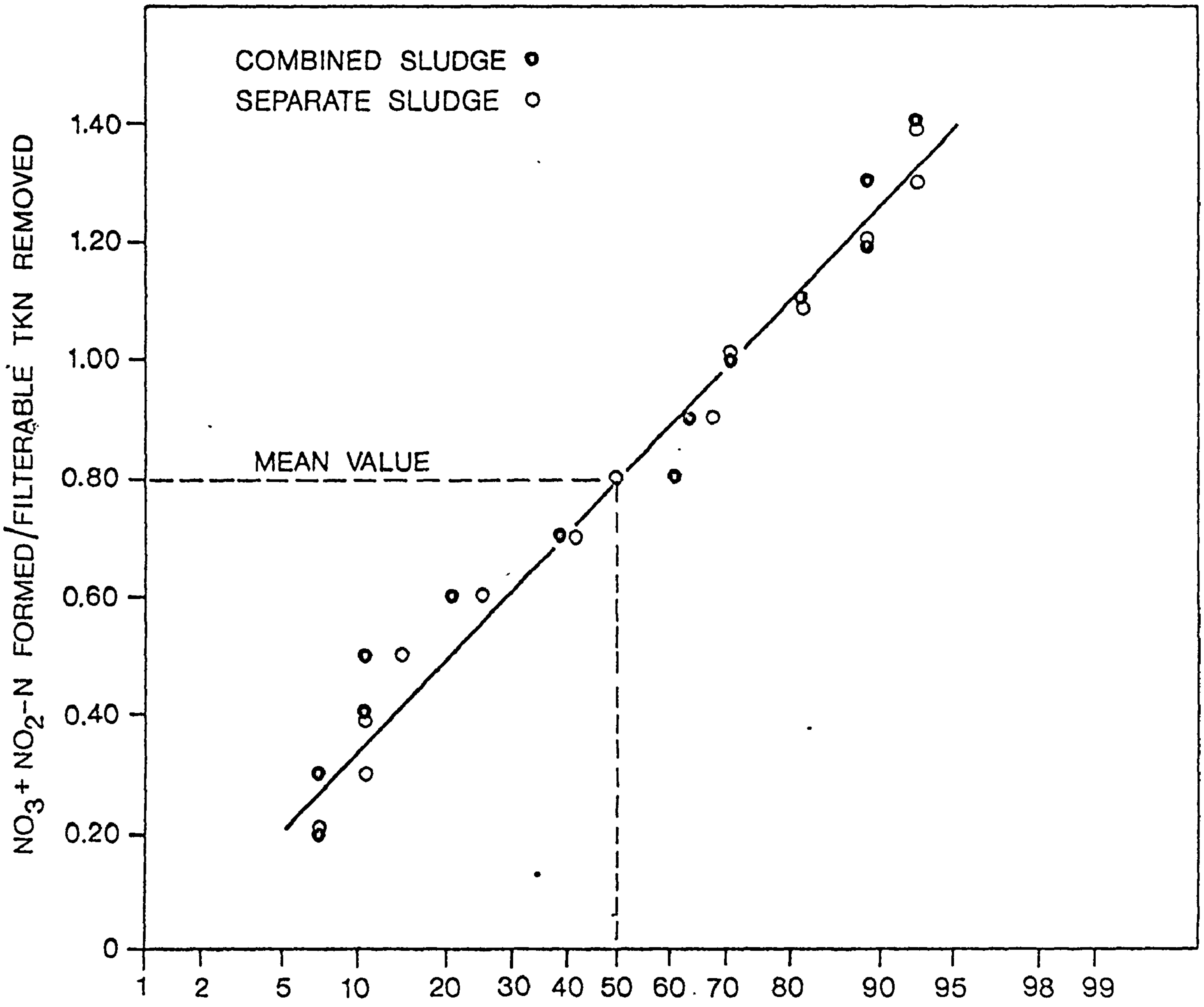


FIG. 7 NITRATE PLUS NITRITE NITROGEN PRODUCTION IN COMBINED AND SEPARATE SLUDGE SYSTEMS

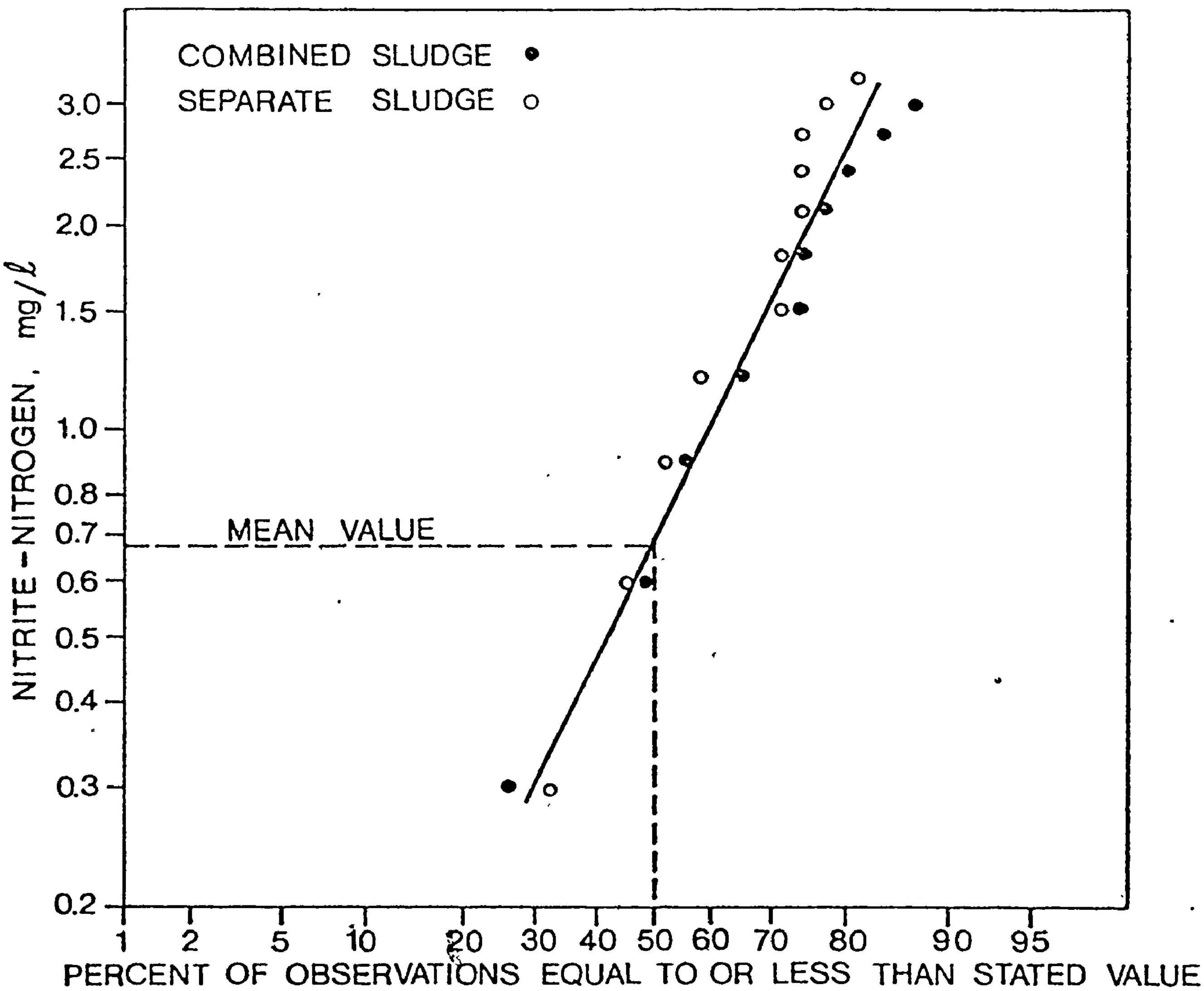


FIG. 8 EFFLUENT NITRITE NITROGEN CONCENTRATION FROM COMBINED AND SEPARATE SLUDGE SYSTEMS

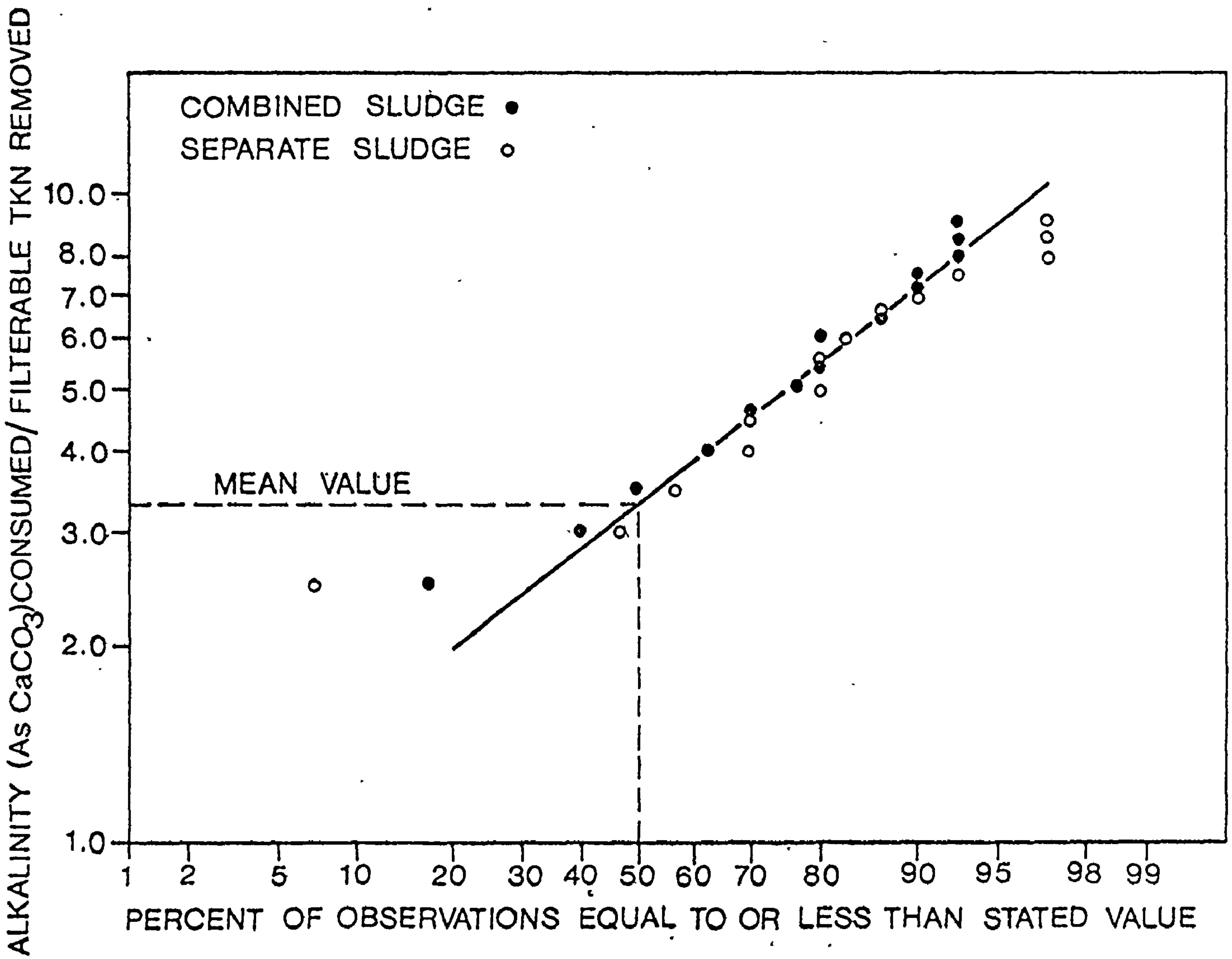


FIG. 9 ALKALINITY CONSUMPTION IN COMBINED AND SEPARATE SLUDGE SYSTEMS

organisms and that the decrease in filterable TKN is proportional to the decrease in NH_4^+-N. Therefore, a more appropriate expression for the alkalinity consumption is in terms of the nitrate plus nitrate nitrogen formed. Using the arithmetic mean values from Figures 7 and 8 the consumption ratio is equal to 4.9 grams of alkalinity (as $CaCO_3$) per gram of NO_3^- + NO_2^--N formed. This value is still less than the theoretical value which is calculated from equations 6 and 7 to be 7.2. Wilson (1975) and Mulburger (1971) working with supported and suspended growth nitrifying systems respectively, found values of 5.9 and 6.1 grams of alkalinity consumed (as $CaCO_3$) per gram of oxidized nitrogen formed.

A paired "t-test" to determine whether there was a difference in suspended solids in the final clarifier effluents from the combined and separate sludge systems indicated a significant difference at the 95% but not at the 99% level (Table 8, TSS vs TSC). No statistical difference was indicated in comparing the two combined sludge systems (Table 9). The mean clarifier effluent suspended solids from both separate and combined sludge systems was 29 mg/l (Figure 10).

In certain instances a nitrogen control program may necessitate the addition of nitrification facilities without subsequent denitrification. In such cases, it is likely that a TKN limit will be specified. Even with complete nitrification, the clarified effluent can be expected to contain a small quantity of filterable organic nitrogen (Figure 11) probably associated with refractory compounds or metabolic by-products. The analytical determination of this material does not appear to be interfered with by the presence of NO_3^--N concentrations (Appendix C, Figure C2). In addition, the clarified effluent will contain 1.0 mg/l non-filterable TKN (Figure 12) caused by the presence of suspended solids as indicated in Figure 10.

Temperature and SRT effects on nitrification

In assessing the performance of the combined and separate sludge systems the analysis of paired data gives no indication of the effect on nitrification of the factors SRT and temperature. The results

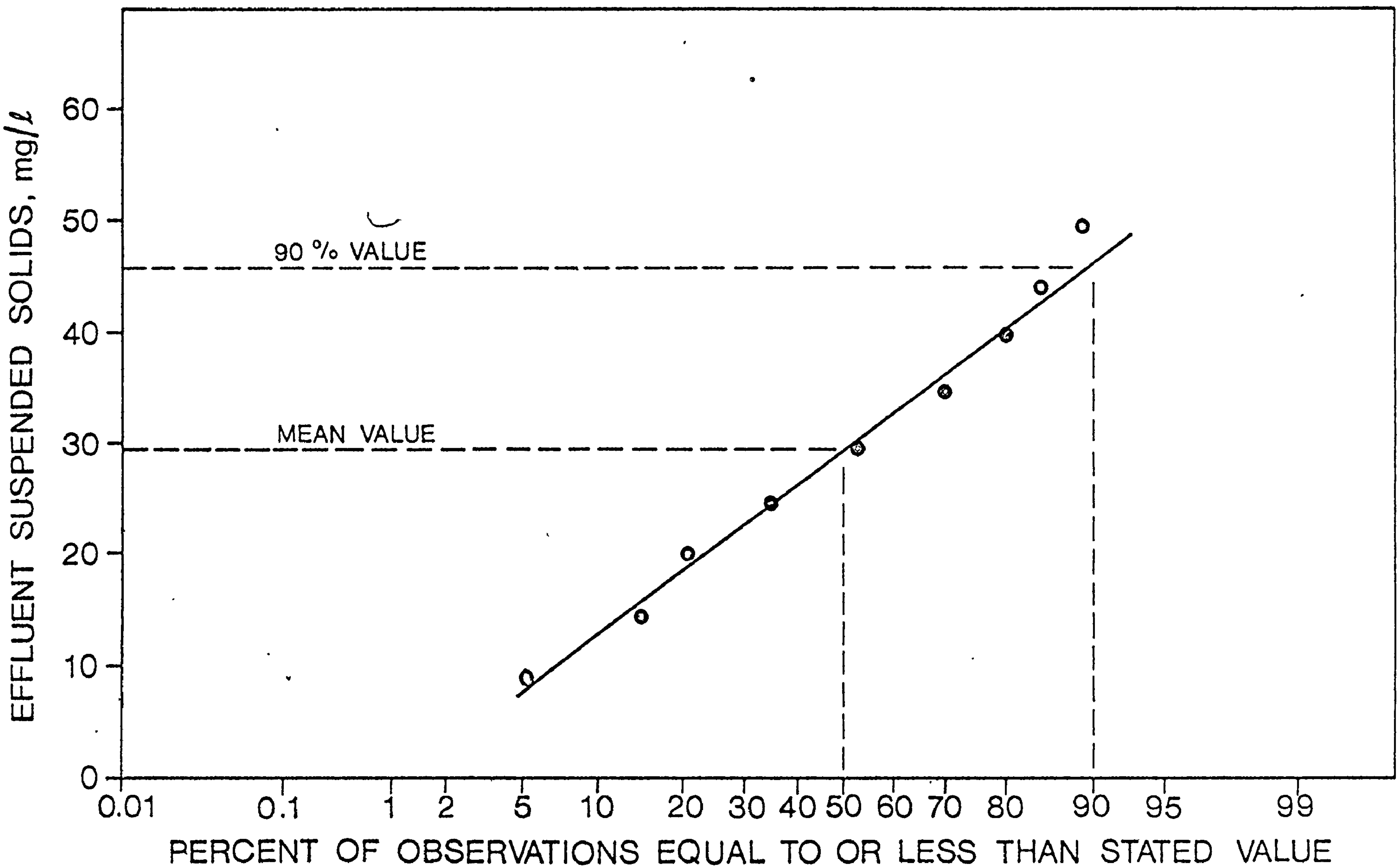


FIG. 10 CLARIFIER EFFLUENT SUSPENDED SOLIDS FROM CARBON REMOVAL-NITRIFICATION SYSTEMS

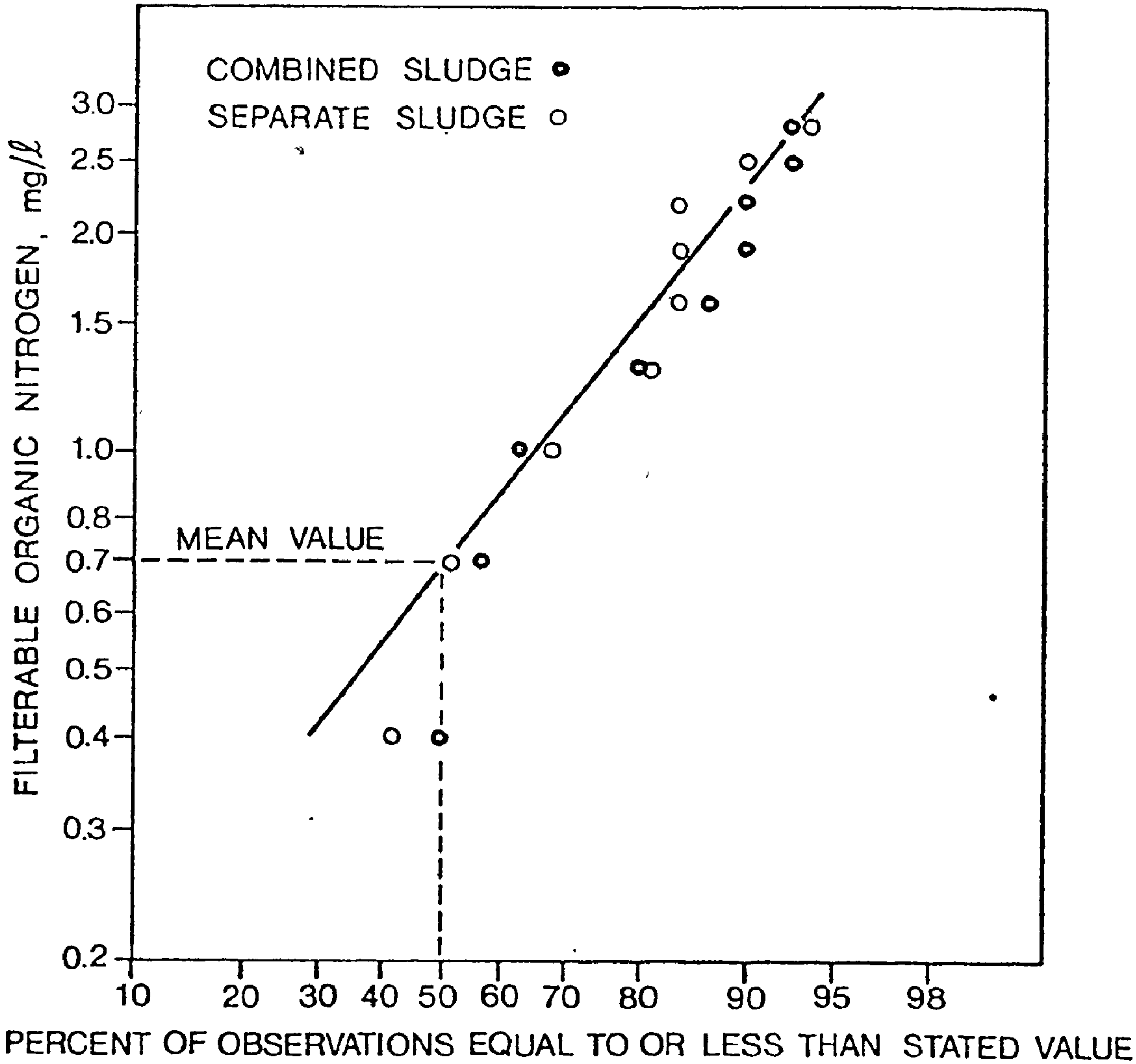


FIG. 11 FILTERABLE ORGANIC NITROGEN FROM CARBON REMOVAL-NITRIFICATION SYSTEMS

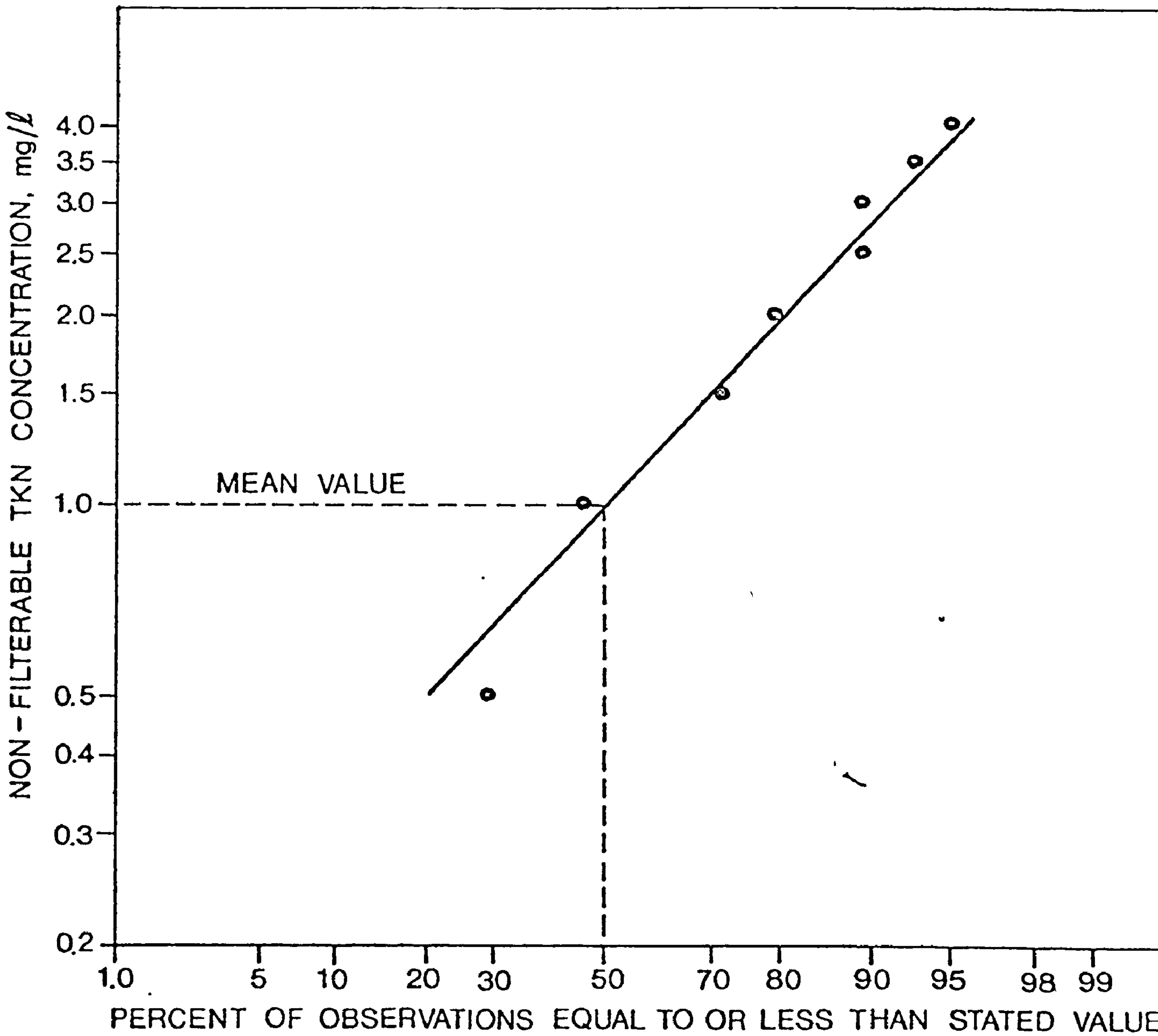


FIG. 12 NON-FILTERABLE EFFLUENT TKN FROM CARBON REMOVAL-NITRIFICATION SYSTEMS

of experiments, designed to compare the alternatives (Table 4), can be used to determine the importance of these factors through an analysis of variance (ANOVA). Tabulation of the TSS sludge system experiments in a form more suitable for an ANOVA (Table 10) reveals a complete factorial design, replicated once, at three levels of SRT and five levels of temperature (3x5). This same design (Table 10) applies to the combined sludge system when the SSC and TSC experiments are considered as one data set.

Temperature and SRT significantly affect filterable TKN removal in combined and separate sludge systems indicated by the values of the variance ratio being greater than the critical "F" value (ANOVA, Table 11). No significant temperature-SRT interaction is evident (Table 11). When the relation between the response (filterable TKN removal) and the levels of SRT and temperature are considered a more detailed ANOVA can be constructed. Since the levels of each variable are at equal intervals (Table 3) the components (linear, quadratic, cubic, etc.) of the main effects of the variables and of the interaction can be determined by means of orthogonal polynomials. This procedure may not only reveal significant main effects and interactions depending on the variable levels, which may have been masked in the overall mean square determination (Table 11), but can give an indication of the relationship between the response and the variables. Applying this procedure, a positive linear correlation is indicated between SRT and filterable TKN removal in the combined and separate sludge systems (Appendix E, Table E1). A curvilinear relationship may be more appropriate to describe the positive relationship of temperature and filterable TKN removal (Table E1). A summary of the calculations involved in preparing Table E1 are given in Appendix E.

The relationships between filterable TKN removal and SRT and temperature can be utilized in the design of carbon removal-nitrification systems. Another design approach for nitrification systems is the use of the unit rate of filterable TKN removal. The "zero-order" nature of the nitrification reaction allows the unit rate to be expressed as a constant (K). The ANOVA based on the experiments designed to compare the alternative carbon removal - nitrification alternatives (Table 10) can be constructed

TABLE 10 TEMPERATURE-SRT FACTORIAL DESIGN

Level of SRT	Level of Temperature				
	1	2	3	4	5
-	PSS-07 PSS-08	PSS-58 PSS-11	PSS-29 PSS-12	PSS-44 PSS-49	PSS-61 PSS-62
0	PSS-01 PSS-17	PSS-20 PSS-21	PSS-25 PSS-23	PSS-31 PSS-34	PSS-53 PSS-52
+	PSS-14 PSS-15	PSS-59 PSS-57	PSS-13 PSS-60	PSS-16 PSS-63	PSS-55 PSS-54

TABLE 11 EFFECTS OF SYSTEM SRT AND TEMPERATURE ON FILTERABLE TKN REMOVAL IN SEPARATE AND COMBINED SLUDGE SYSTEMS

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Square (MS)	Variance Ratio (MS/MSPE)	F α=.95
Main Effects					
SRT: TSS	935.63	2	467.82	14.49	3.68
SRT: SSC or TSC	886.20	2	443.10	15.10	3.68
Temp.: TSS	7339.02	4	1834.75	56.84	3.06
Temp.: SSC or TSC	10091.20	4	2552.80	85.96	3.06
SRT and Temp. Interaction: TSS	364.97	8	45.62	1.41	2.64
SRT and Temp. Interaction: SSC or TSC	442.01	8	55.25	1.88	2.64
Pure Error (PE): TSS	484.23	15	32.28	-	-
Pure Error (PE): SSC or TSC	440.15	15	29.34	-	-

with the unit rate of filterable TKN removal as the response. The unit rate values for these experiments together with the results of other pseudo "steady-state" experiments undertaken to allow for complete system design are tabulated in Appendix C (Table C1).

The unit rate of filterable TKN removal in combined and separate sludge systems is significantly affected by temperature (Table 12). The system SRT has an important effect on the unit rate in the combined sludge systems. In the separate sludge system the result is dependent on the level of the variable as indicated by the more detailed ANOVA (Appendix E, Table E2). In both combined and separate sludge systems there are significant temperature - SRT interactions (Tables 12 and E2) affecting the unit filterable TKN removal rate.

In order to be useful for system design it is important to express the effects of temperature and SRT on nitrification in a concise fashion. The Arrhenius relationship (equation 16) has often been used to represent the variation of substrate removal with temperature in biological systems. A reparamaterized form of this relationship is:

$$K = K^* \, e^{-E/R\left(\frac{1}{T} - \frac{1}{To}\right)}, \qquad \text{............(22)}$$

where K^* = $Ae^{-E/RTo}$,

K = reaction rate constant (day^{-1}),

A = frequency factor (day^{-1}),

E = activation energy (cal g-mole^{-1}),

R = universal gas constant (cal g-mole^{-1} $^{o}K^{-1}$),

T = temperature (^{o}K), and

To = median of the temperature range (^{o}K).

This form minimizes the interaction between the frequency factor (A) and the activation energy (E) which makes the Arrhenius equation a difficult expression to fit.

An analysis of variance (ANOVA) indicated no lack of fit, at a critical "F" value of α = .99, when the reparameterized Arrhenius model was applied to the separate or combined sludge system unit rate data at each individual system SRT of 4, 7, and 10 days (Table 13) based on the complete pseudo "steady-state" data (Table C1). The details concerning the

TABLE 12 EFFECTS OF SYSTEM SRT AND TEMPERATURE ON THE UNIT RATE OF FILTERABLE TKN REMOVAL IN SEPARATE AND COMBINED SLUDGE SYSTEMS

Source of Variation	*Sum of Squares	Degrees of Freedom	*Mean Square (MS)	Variance Ratio (MS/MSPE)	F α=.95
Main Effects					
SRT: TSS	2.64	2	1.32	2.75	3.68
SSC or TSC	1.56	2	0.78	13.00	3.68
Temp.: TSS	125.98	4	31.50	65.61	3.06
SSC or TSC	18.84	4	4.71	78.50	3.06
SRT and Temp. Interaction: TSS	13.50	8	1.69	3.52	2.64
SSC or TSC	4.82	8	0.60	10.04	2.64
Pure Error (PE): TSS	7.18	15	0.48	-	-
SSC or TSC	0.86	15	0.06	-	-

Note: *values x 10^3

TABLE 13 UNIT NITRIFICATION RATE VARIATION WITH TEMPERATURE

Reactor Configuration	Temp. Range °C	Arrhenius Model Parameters E cal/g-mole	A*	Anova Results MSLOF/MSPE	F α=.95	F α=.99
Carbon Removal -Nitrification Systems						
Combined Sludge						
4 day SRT	5-25	24700	1.47×10^{17}	3.73	3.25	5.41
7 day SRT	5-25	13300	3.06×10^{8}	3.57	2.64	4.00
10 day SRT	5-25	12450	8.29×10^{7}	0.45	5.19	11.39
4,7, and 10 day SRT (pooled data with K/K*)				31.08	1.9	2.5
Separate Sludge						
4 day SRT	5-25	29700	1.45×10^{21}	5.59	3.33	5.64
7 day SRT	5-25	17550	9.76×10^{11}	1.86	2.70	4.14
10 day SRT	5-25	16950	4.66×10^{11}	0.25	5.19	11.39
4,7, and 10 day SRT (pooled data with K/K*)				35.52	2.0	2.5
Nitrification System						
6 day SRT	6-25	32750	4.68×10^{23}	1.69	3.33	5.64
10 day SRT	6-25	20750	3.64×10^{14}	4.16	2.70	4.14
15 day SRT	6-25	18850	1.48×10^{13}	0.33	5.19	11.39

Note: In calculating A reference temp. = To = 273 + 15 = 288^{o}K determination of the ANOVA results are given in Appendix E. The Arrhenius models are illustrated in Figures 13, 14 and 15 together with the models for the nitrification reactor (B2) of the separate sludge system. A system solids retention time of four, seven and ten days in the separate sludge system corresponds to values of six, ten, and fifteen days in the nitrification reactor. To examine any difference in temperature sensitivity between the four, seven, and ten day SRT's for the combined and separate sludge systems, the data were pooled using the ratio of K/K in equation 22. The lack of fit of the resulting single models (Table 13) indicates a significant temperature - SRT interaction verifying the previous results (Table 12 and E2). The decrease in activation energy (E) with increased SRT indicates reduced temperature sensitivity at high SRT values. The observed decrease in activation energy is caused by different relative changes in the fraction of nitrifiers present for a given temperature change for systems at different sludge ages. The importance of defining the system SRT in stating nitrification rates is illustrated by the variation in the Arrhenius parameter values (Table 13). The difference in rates observed by other authors (Figure 16) may be due to differences in SRT and/or the influent BOD_5/TKN ratio, another important variable shown to effect the fraction of nitrifiers in an activated sludge plant (Brown and Caldwell, 1975).

The relationship between SRT and the growth rate of organisms in an activated sludge plant (equation 9) presents a more fundamental approach to design for nitrification in a combined sludge system. This relationship is indirectly represented according to the correlation between the amount of filterable TKN removal and SRT and temperature. Expressing the effect of temperature on the amount of filterable TKN removal, according to the modified Arrhenius relationship (equation 22), the resulting individual models for the combined and separate sludge systems together with the models for the nitrification reactor (B2) are illustrated in Figures 17, 18, and 19. In this case the constant K represents the removal of filterable TKN.

Pooling the filterable TKN removal data to examine any difference in temperature sensitivity, an ANOVA indicated that the resulting single model for the combined sludge system was statistically unacceptable (Table E5).

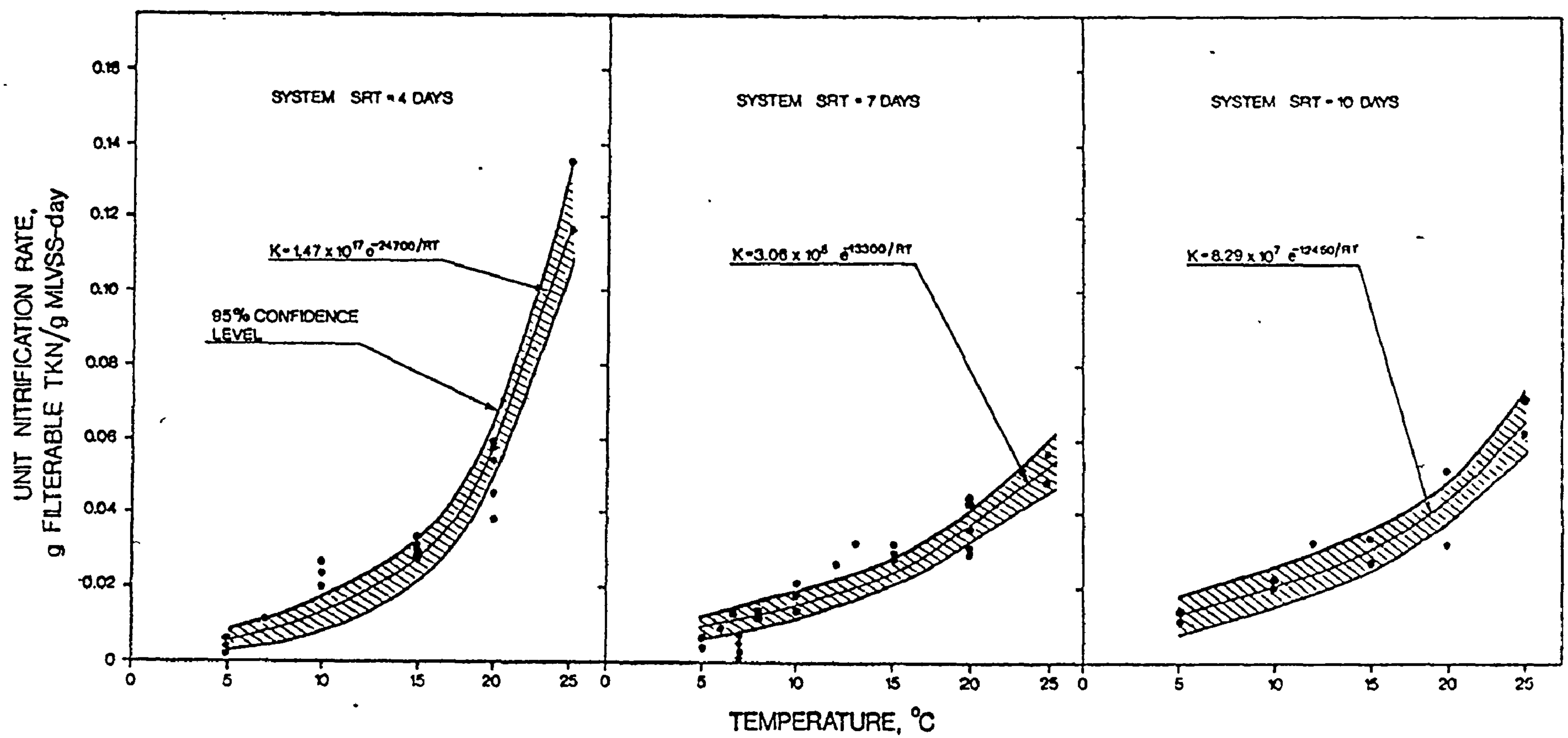


FIG. 13 UNIT RATE OF NITRIFICATION IN THE COMBINED SLUDGE SYSTEM

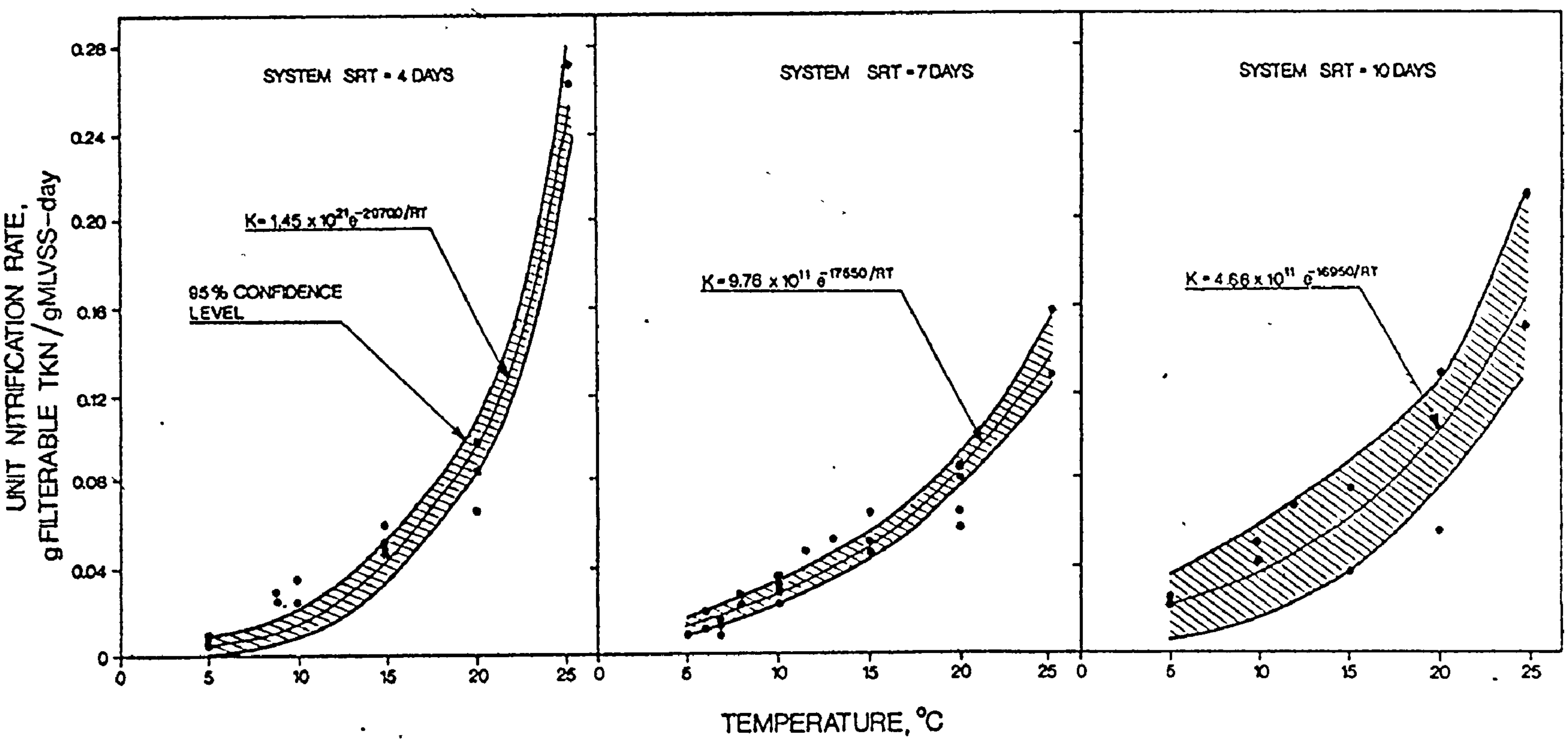


FIG. 14 UNIT RATE OF NITRIFICATION IN THE SEPARATE SLUDGE SYSTEM

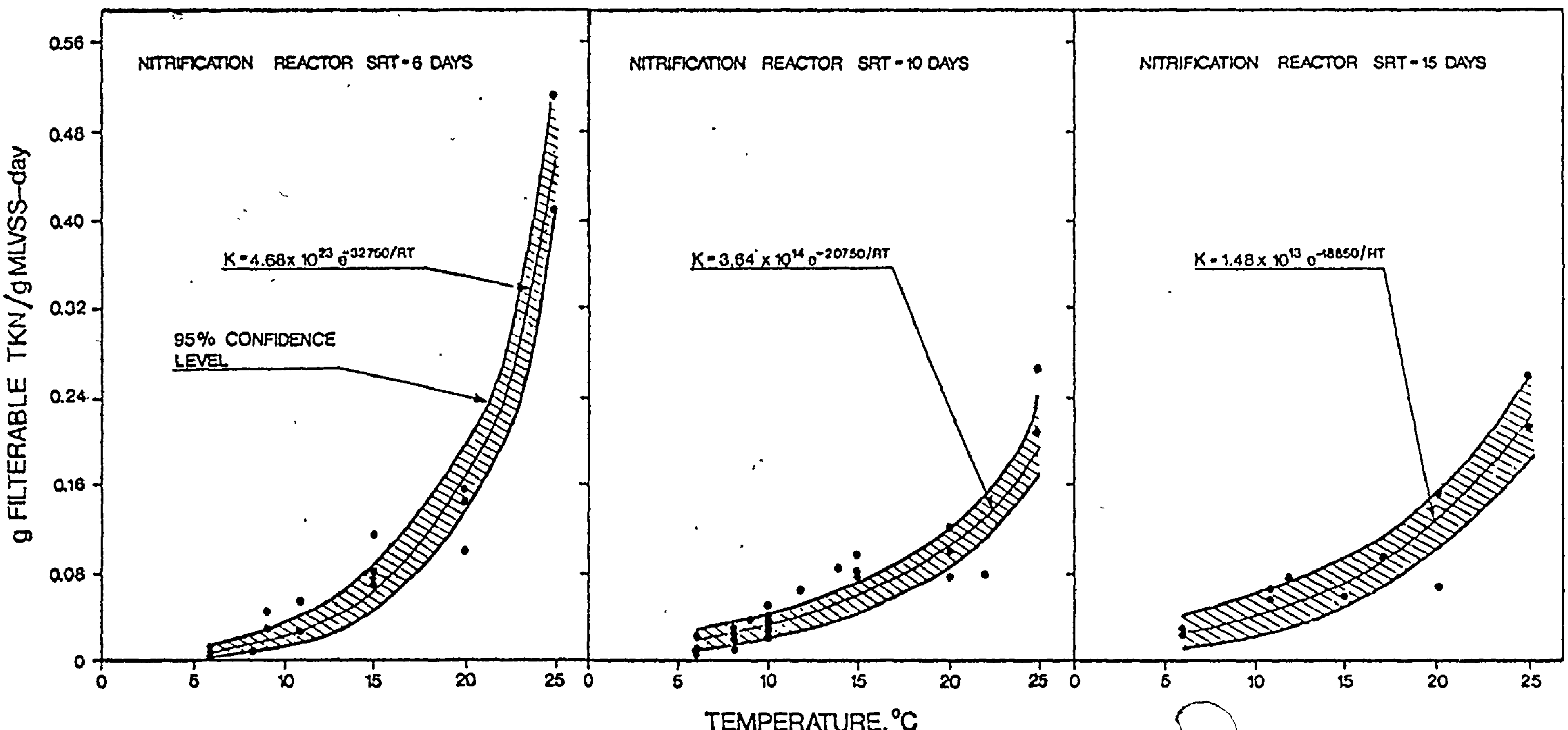


FIG. 15 UNIT RATE OF NITRIFICATION IN THE SEPARATE SLUDGE NITRIFICATION REACTOR

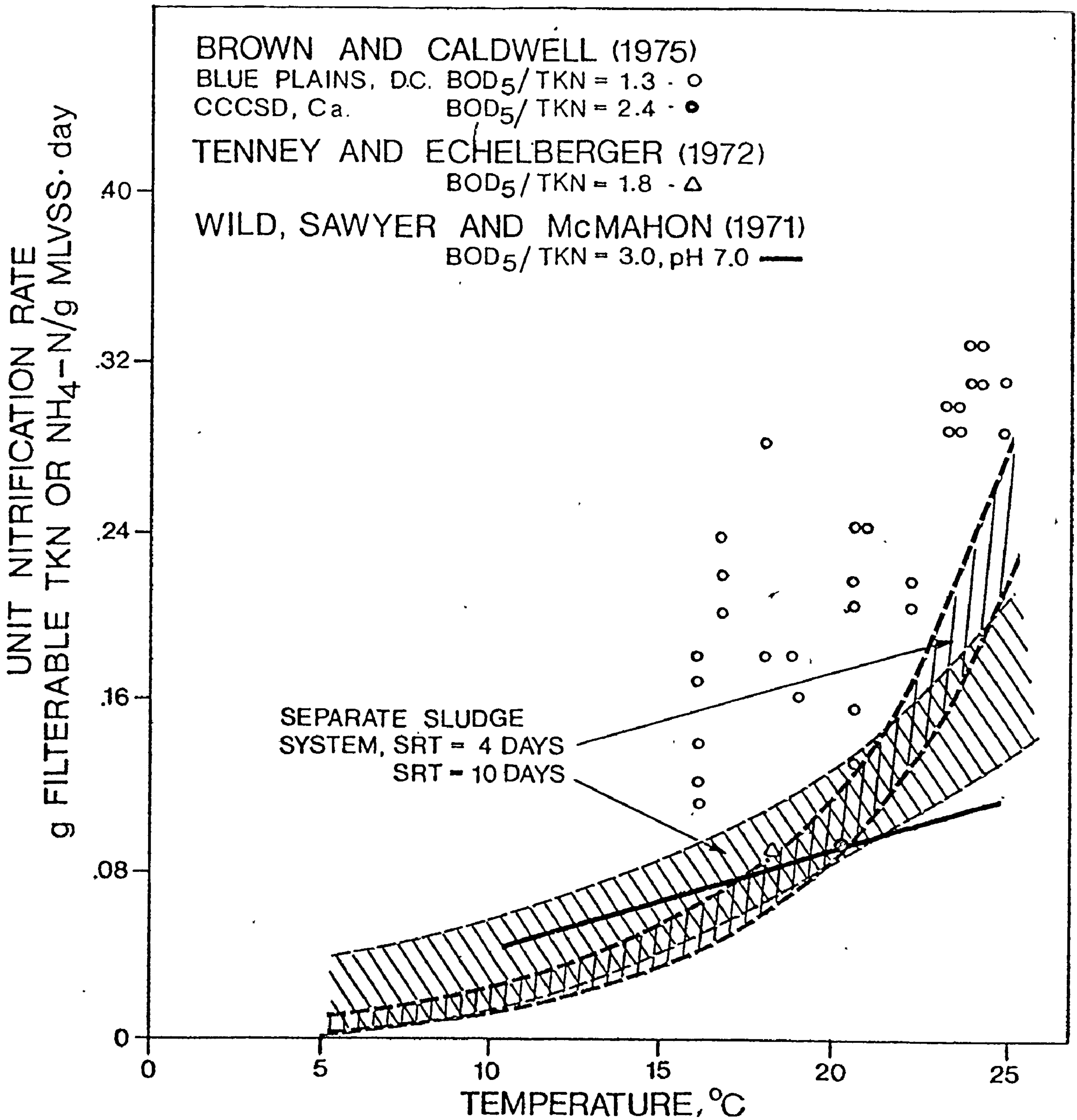


FIG. 16 NITRIFICATION RATES REPORTED BY VARIOUS AUTHORS

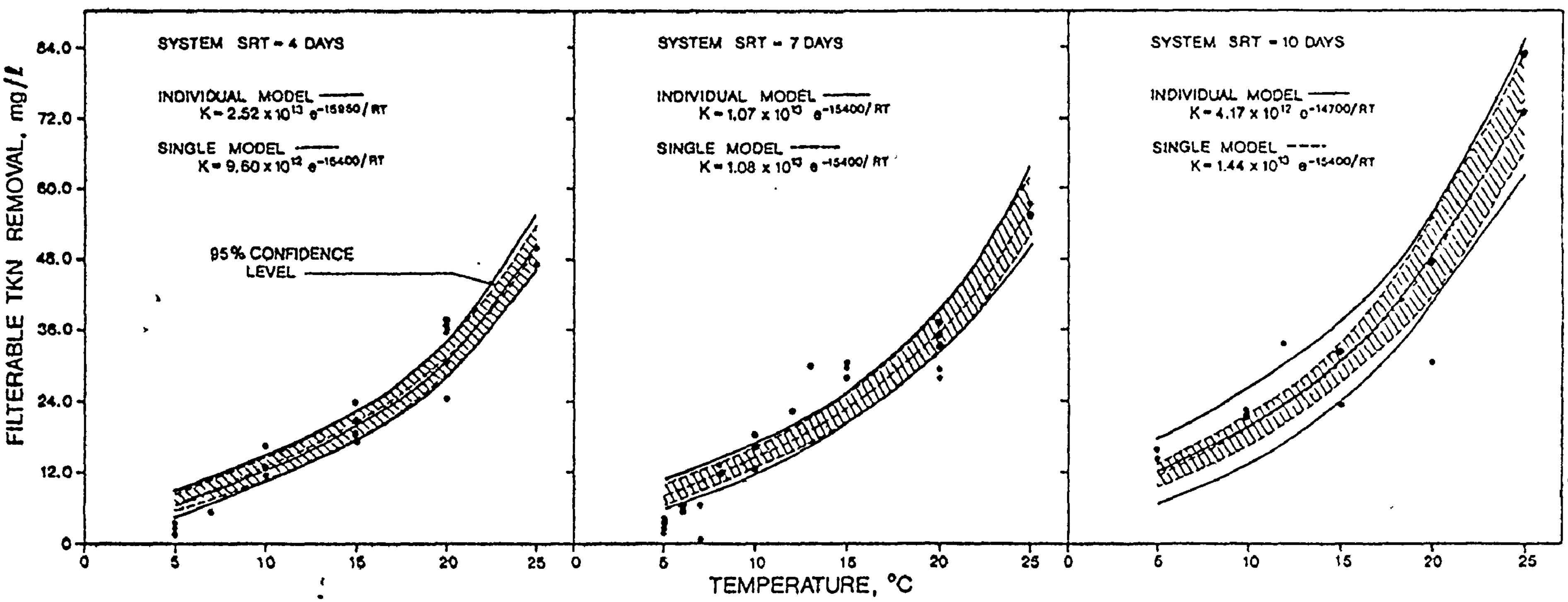


FIG. 17 FILTERABLE TKN REMOVAL IN THE COMBINED SLUDGE SYSTEM

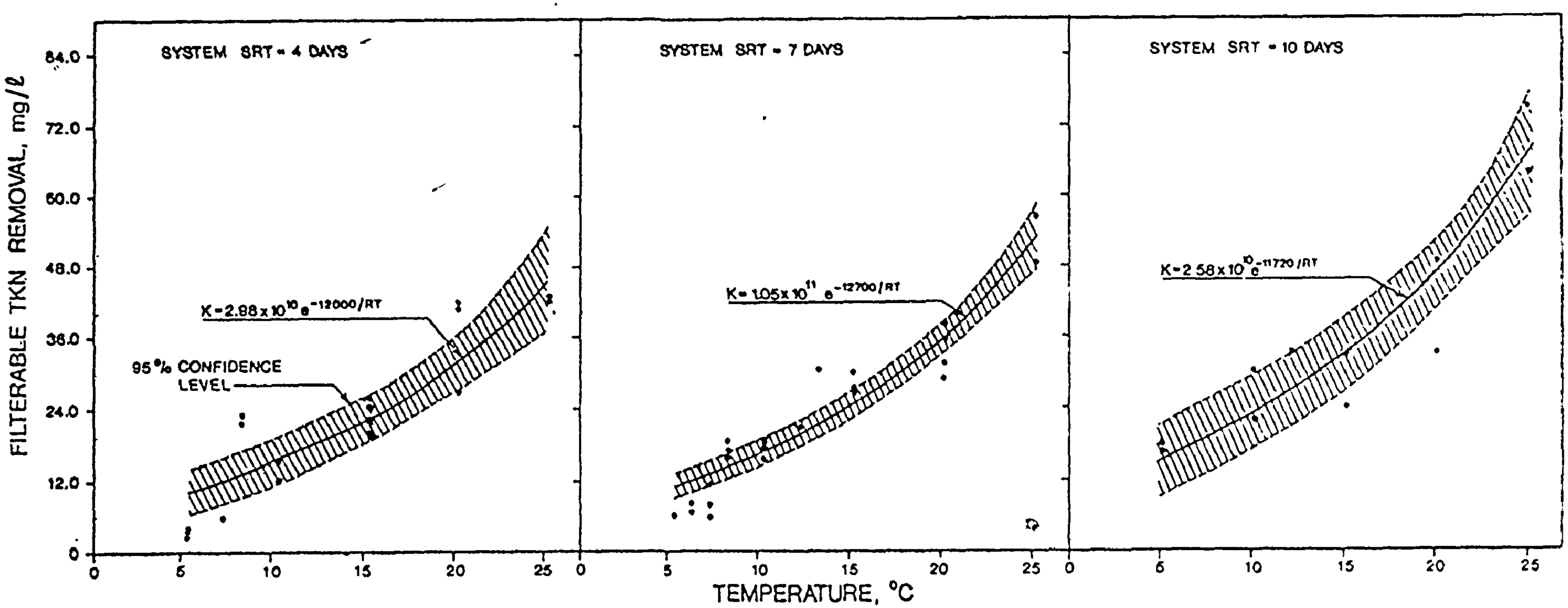


FIG. 18 FILTERABLE TKN REMOVAL IN THE SEPARATE SLUDGE SYSTEM

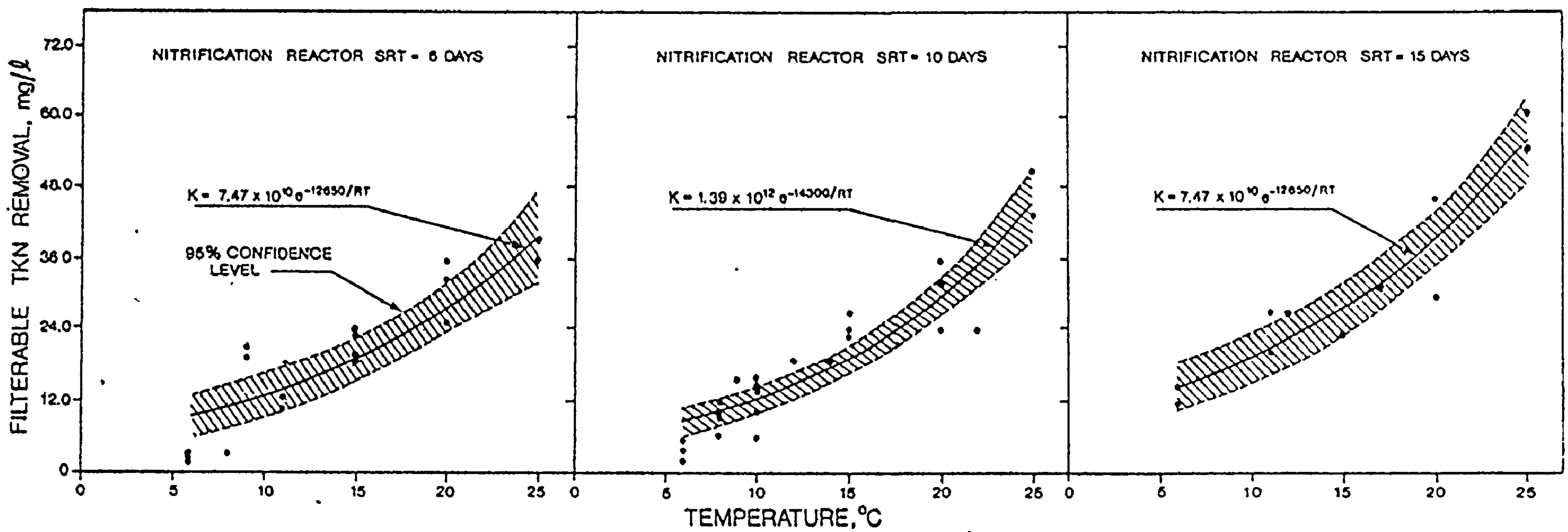


FIG. 19 FILTERABLE TKN REMOVAL IN THE SEPARATE SLUDGE NITRIFICATION REACTOR

A similar result was found for the separate sludge system. The difference between the single models with a common activation energy (E), and the individual models is not readily discernible (Figure 17). This observation is supported by the lack of a temperature - SRT interaction previously noted (Table 11) in analyzing the results of the experiments designed to compare the alternative systems. A common temperature sensitive reflects equal relative changes in the number of nitrifiers present for a given temperature change for systems at different sludge ages.

The filterable TKN removal - SRT - temperature relationships (Figures 17, 18 and 19) suggest an independence of TKN removal and hydraulic residence time (HRT). This is verified by examining observed results at a substantially different HRT but at equal SRT and temperature conditions (Figure 20, Table C4).

By presenting the performance of the combined carbon removal-nitrification system according to Figure 17, an independence is implied between TKN removal and the BOD_5 loading. A different value for the influent BOD_5 from that encountered in this study will result in a difference in cell yield (heterotrophs) at the same SRT, and subsequently a difference in the amount of N removed by synthesis. Accounting for this difference, the pseudo "steady-state" design of nitrifying activated sludge system can be specified by noting the SRT necessary for a given filterable TKN removal. Fixing the SRT establishes the growth rate of both the autotrophic nitrifier population and the heterotrophic organisms. From the growth rate-substrate removal rate relationship for the heterotrophic population the other necessary design parameters (hydraulic detention time, mixed-liquor volatile, suspended solids concentration, etc.) can be established (Lawrence and McCarty, 1970).

Solids Production

Any postulated advantages of the separate sludge system such as greater stability or increased buffering capacity to compounds toxic or inhibitory to nitrification must be balanced against the additional cost of added clarification facilities and increased solids production. By determining the cumulative solids wasted during a pseudo "steady-state" operating period either in the process effluent or by intentional daily

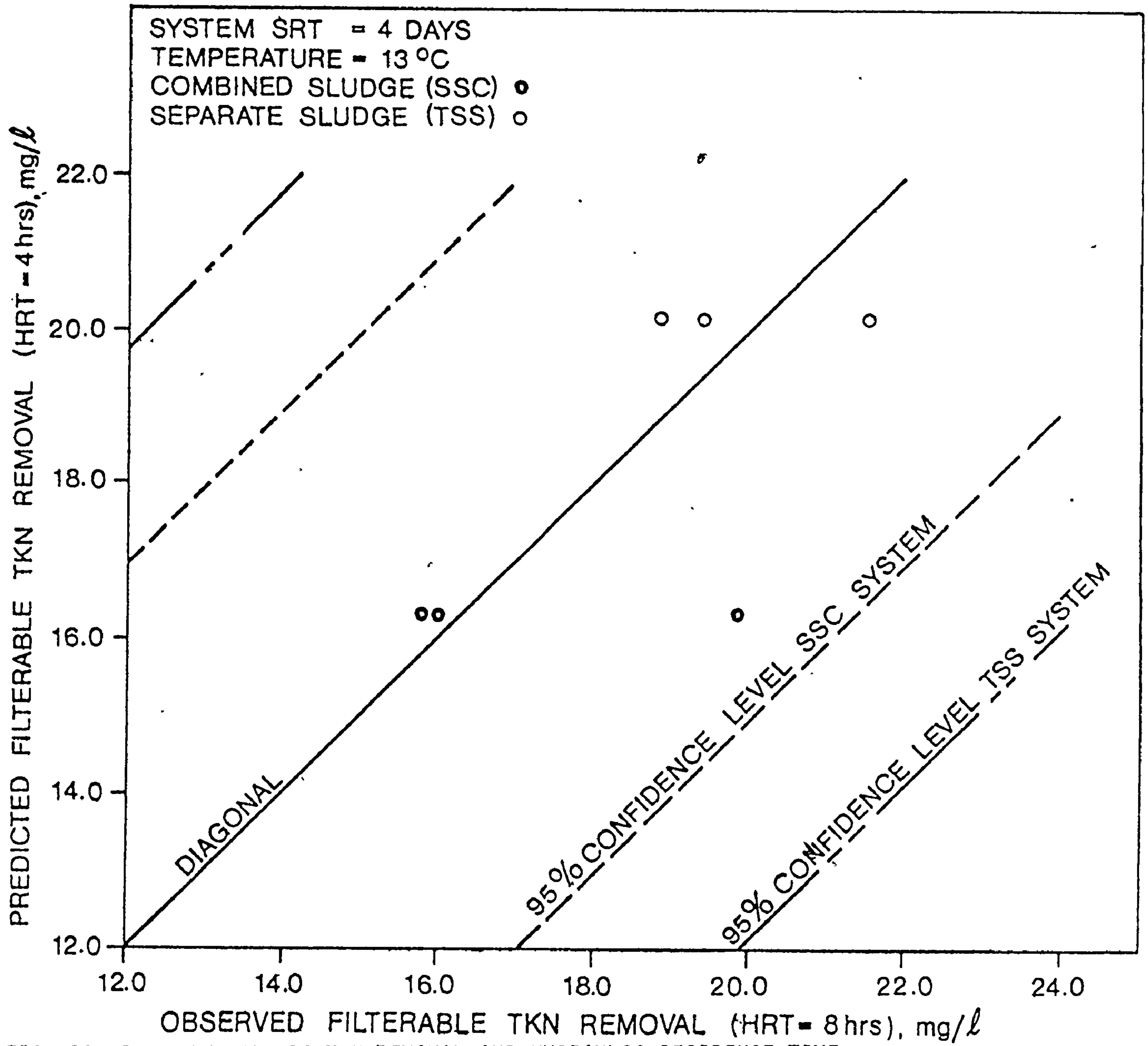


FIG. 20 INDEPENDENCE OF TKN REMOVAL AND HYDRAULIC RESIDENCE TIME

wasting, solids production from the parallel operating alternatives was assessed. During the study, an average 1.6 kg of solids was wasted from the separate sludge system for every 1 kg wasted from the combined system (Figure 21).

Dynamic Behaviour of Nitrification Systems

The results of the experiments performed under non-steady conditions (Table 5) are included in Appendix B.

System response to pH and temperature changes

The transitional or short term response of the combined (SSC) and separate (TSS) sludge systems to changes in temperature and pH was investigated first. Parallel operation afforded a direct qualitative comparison of the response and recovery profiles of the carbon removal-nitrification systems.

A slower response to a step-down in temperature is indicated (Figure 22) for the separate sludge system. The approach by this sytem to TKN values "predicted" by the unit rate models at system SRT's of four days (Figures 13 and 14), lagged behind the combined sludge system. The minimum attainable filterable TKN concentration from the combined and separate sludge systems is 0.7 mg/l (Figure 9). The change in effluent filterable COD concentration further indicated the stability of the separate sludge system to changes in temperature.

The response to a reduction in feed pH was a significant change in effluent pH, and filterable TKN concentration (Figure 23). The separate systems exhibited a buffering capacity to a change in system pH which is reflected by the lag in response and recovery in terms of filterable effluent TKN concentration. This might be explained by the difference in system hydraulics. The nitrifying reactor (B2), of the separate sludge system (B1 and B2), exhibited a pH profile having a greater magnitude and a shorter duration than that of the combined sludge reactor. The "predicted" increased effluent filterable TKN reflects the loss in reactor volatile solids caused by decreased settleability. The observed effluent filterable COD concentrations

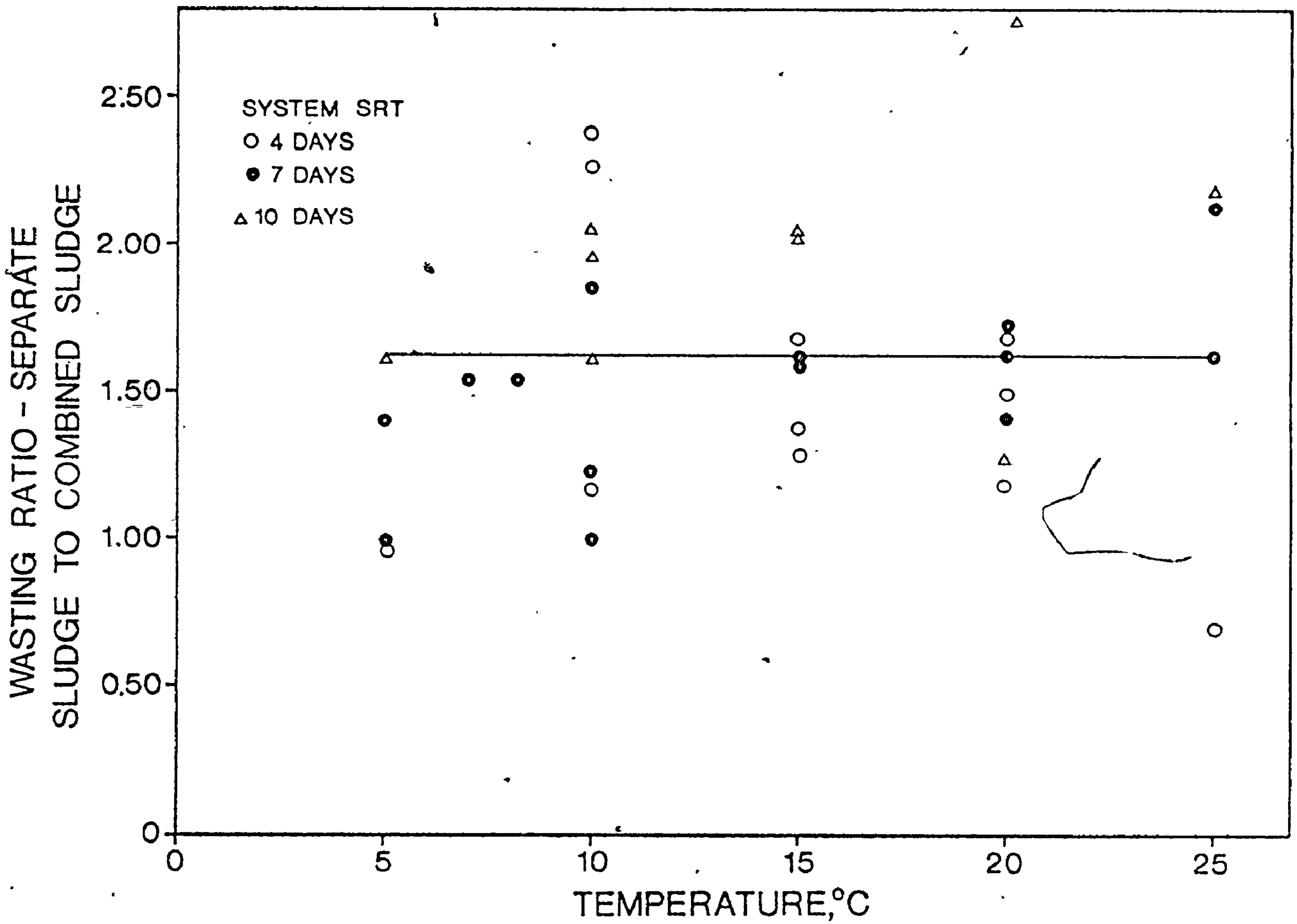


FIG. 21· REQUIRED SOLIDS WASTING IN SEPARATE AND COMBINED SLUDGE SYSTEMS

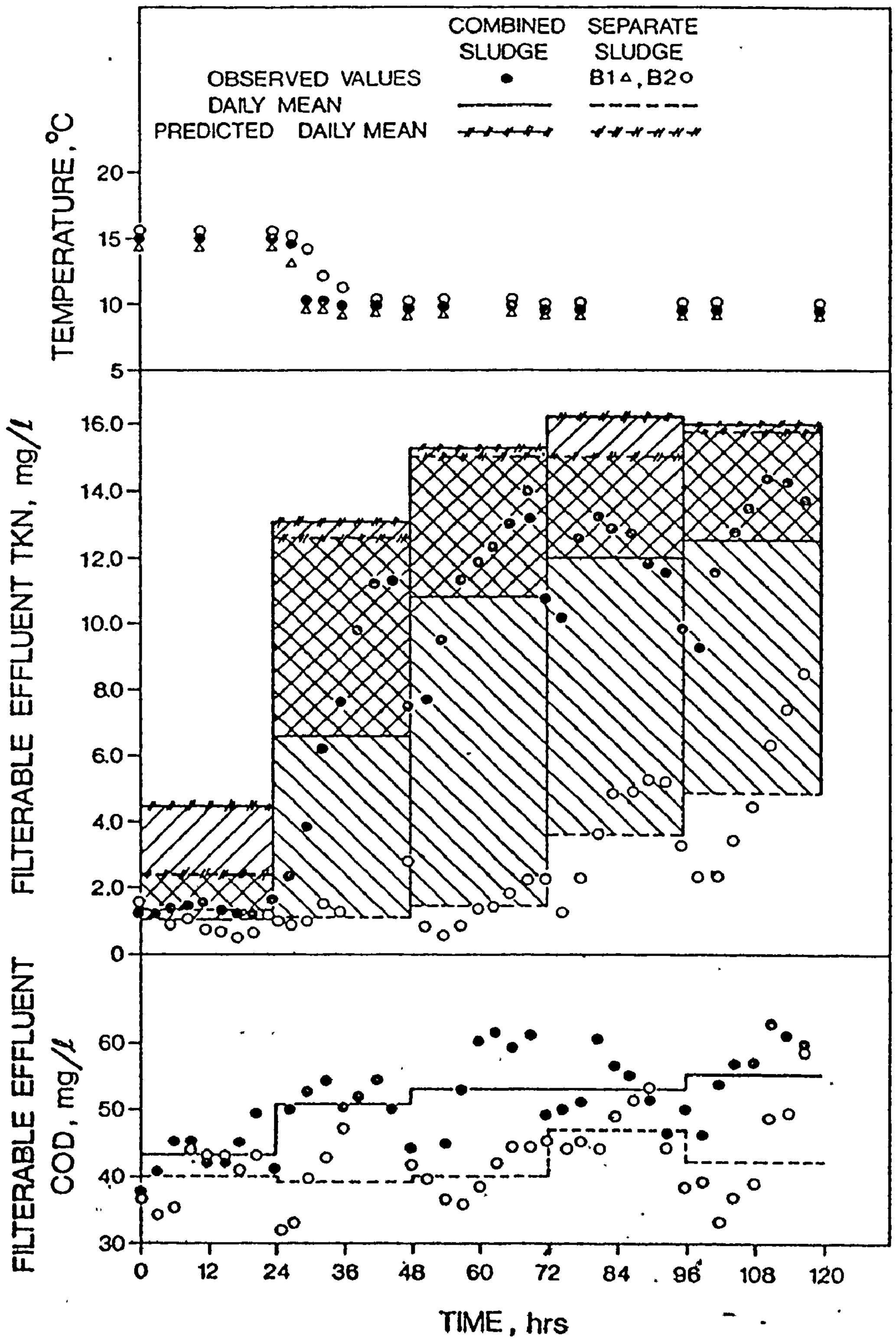


FIG. 22 RESPONSE OF CARBON REMOVAL NITRIFICATION SYSTEMS TO TEMPERATURE STEP-DOWN

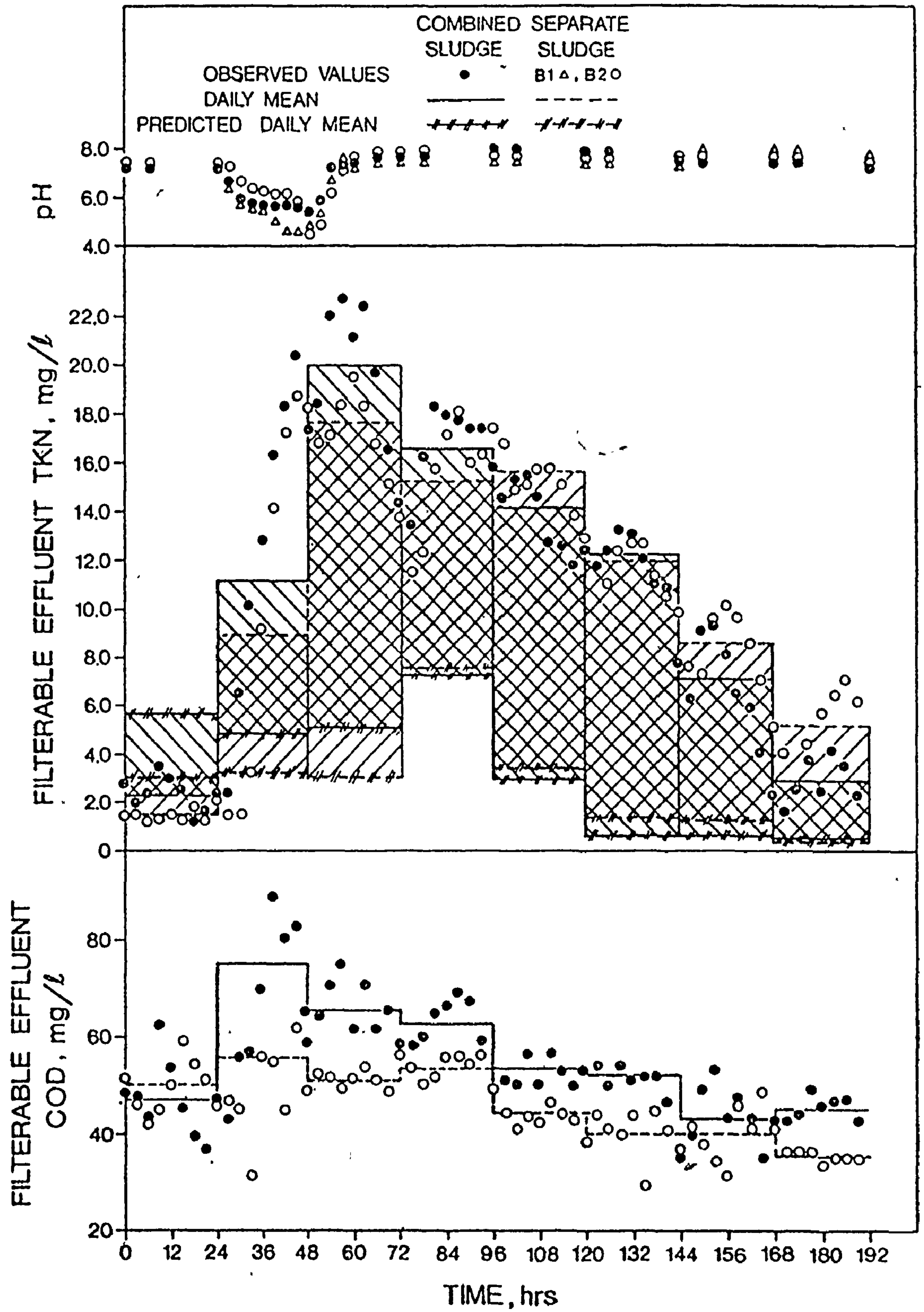


FIG. 23 RESPONSE OF CARBON REMOVAL-NITRIFICATION SYSTEMS TO pH IMPULSE

(Figure 23), indicate the reduced effect of the toxic conditions on the separate sludge system.

<u>System response to hydraulic, organic, and inorganic loading variations</u>

Deterministic and linear dynamic - stochastic models were both considered in attempting to describe the response of the carbon removal-nitrification systems to variations in hydraulic, organic, and inorganic loading. The complexity of the activated sludge process, operated for carbon removal-nitrification, made it necessary to make a number of simplifying assumptions in the development of a deterministic model for the SSC sludge system. Even with these inherent weaknesses, which will give rise to unexplainable output variations or noise, the usefulness of the model is complicated by the number of time-dependent growth and substrate removal functions (Figure 4). With this in mind transfer function models together with linear time series models were used to describe the response of the combined and separate sludge systems to input variations.

Experiment D5 (Table 5) was designed to allow development of the linear dynamic-stochastic models. The designed input series (Figure 24) separated out the correlation between the input variables allowing assessment of the effects of flow, filterable OC, and filterable TKN on the output concentrations of filterable TKN and nitrate for the two-stage separate and single-stage combined sludge systems.

The cross correlation results indicated that for both sludge systems, the effluent filterable TKN concentration might be expected to increase in response to increases in influent filterable TKN concentration and flow upon the two hour analytical results (Figure 25). No significant response to changes in influent filterable OC concentration would be expected (Figure 25).

In evaluating the effluent nitrate-nitrogen response, a positive correlation to influent filterable TKN was indicated. The negative trend of the cross correlation functions between effluent nitrate concentration and influent filterable OC and flow indicated a possible significant negative

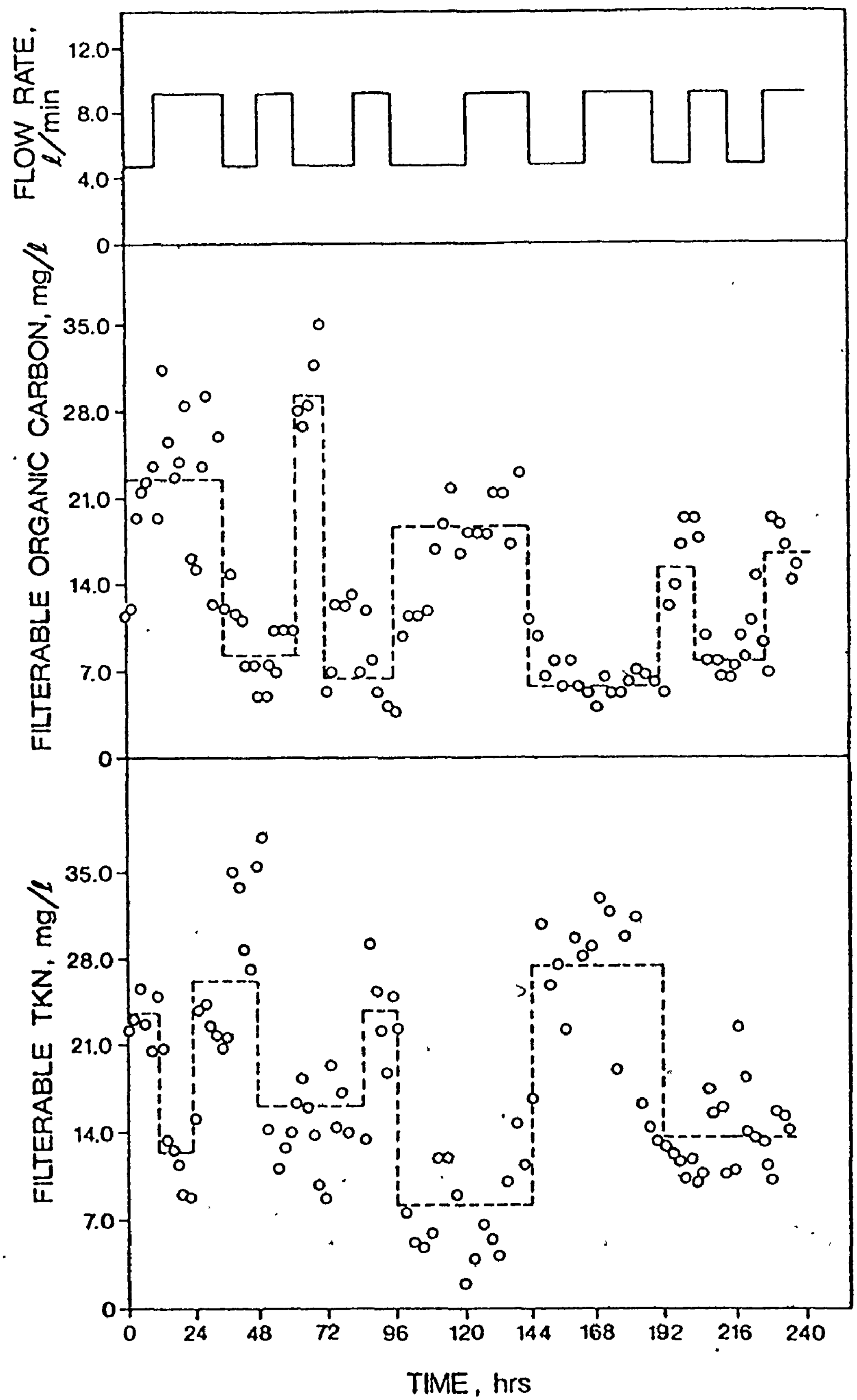


FIG. 24 PROGRAMMED INFLUENT SERIES

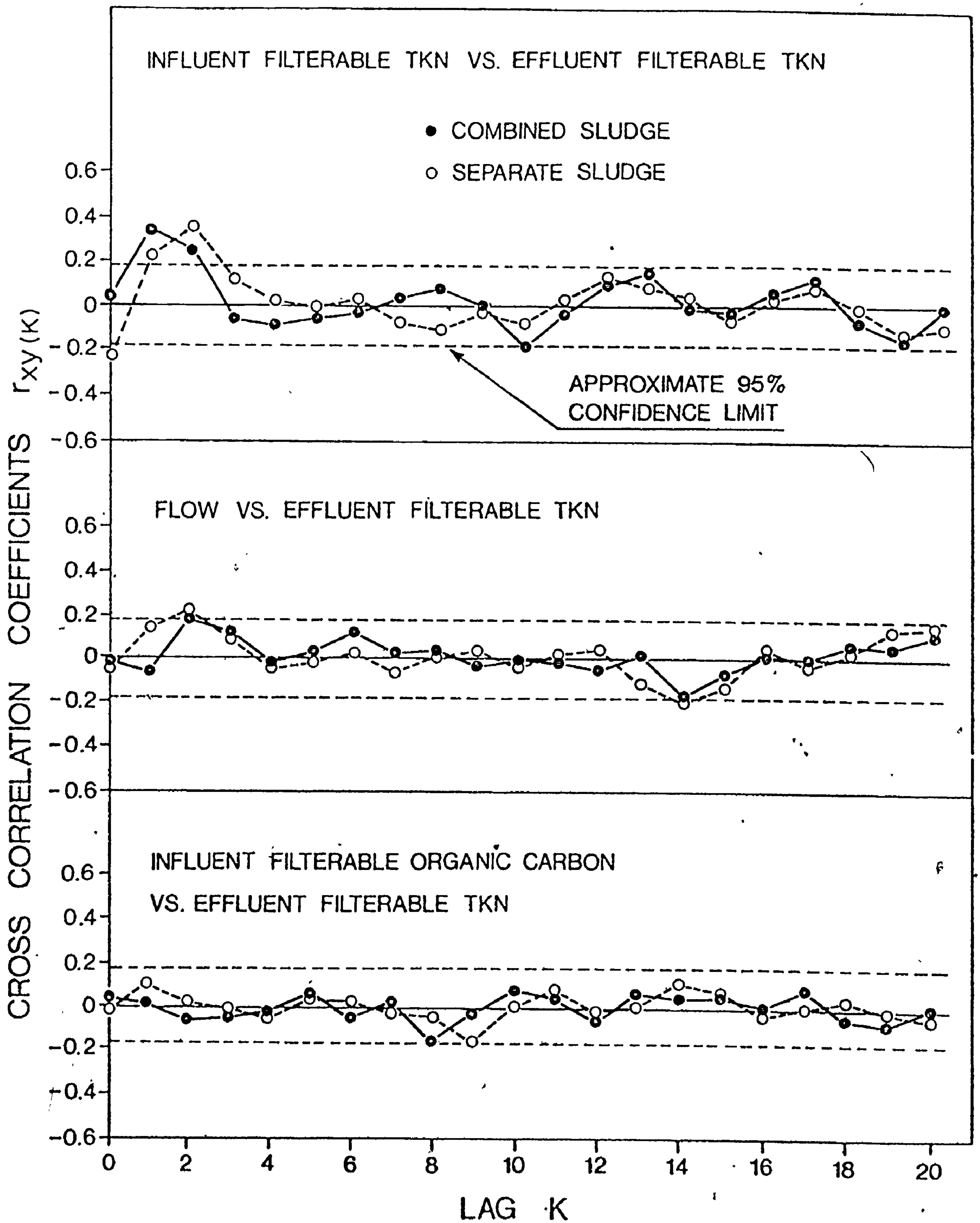


FIG. 25 CROSS CORRELATION RESULTS FOR EFFLUENT FILTERABLE TKN

correlation when the filterable OC loading (filterable OC x flow) was considered as the input variable to the separate and combined sludge systems (Figure 26).

Initial parameter values for the tentative transfer function models relating the output filterable TKN and NO_3^--N values to the input variables were calculated by first determining the impulse response weights (Vi). The parameters in the tentative models were then estimated using non-linear least squares. Examination of the residuals of the fitted models led to the identification of the noise model orders. Re-estimation of the parameters led to combined transfer function noise models for effluent filterable TKN and NO_3^--N (Tables F1 and F2). Comparison procedures and individual evaluation through diagnostic checking (Appendix F) led to the final model forms (Table 14). The computer programs used to determine auto and cross correlation results, impulse response weights, and least square parameter values are included in Appendix F together with examples of the programming results.

The observed and model results (Figure 27 , Table 14) indicate that the effluent filterable TKN concentration from both systems responded positively to variations in TKN loading, but showed no significant response to changes in filterable OC concentration or loading. The magnitude and lag of the response was similar for both systems. The effluent NO_3^--N concentration from the separate and combined sludge systems responded positively to changes in filterable TKN concentration and negatively to filterable OC loading.

Parallel reactor operation afforded insight into the response and recovery profiles of effluent filterable TKN from the combined and separate sludge systems when they were subjected to sudden changes in flow and flow plus filterable OC and TKN concentration levels (Table 5, D3 and D4). The observed results indicate that the magnitude of the response was greater in the separate sludge system (Figure 28). This may be due to the difference in hydraulic properties of the two systems. The results of experiment D9 (Figure 29) indicate the further the deviation from complete mixing, the greater the magnitude of the response. The value of the dimensionless dispersion parameter (D/uL) for the five-

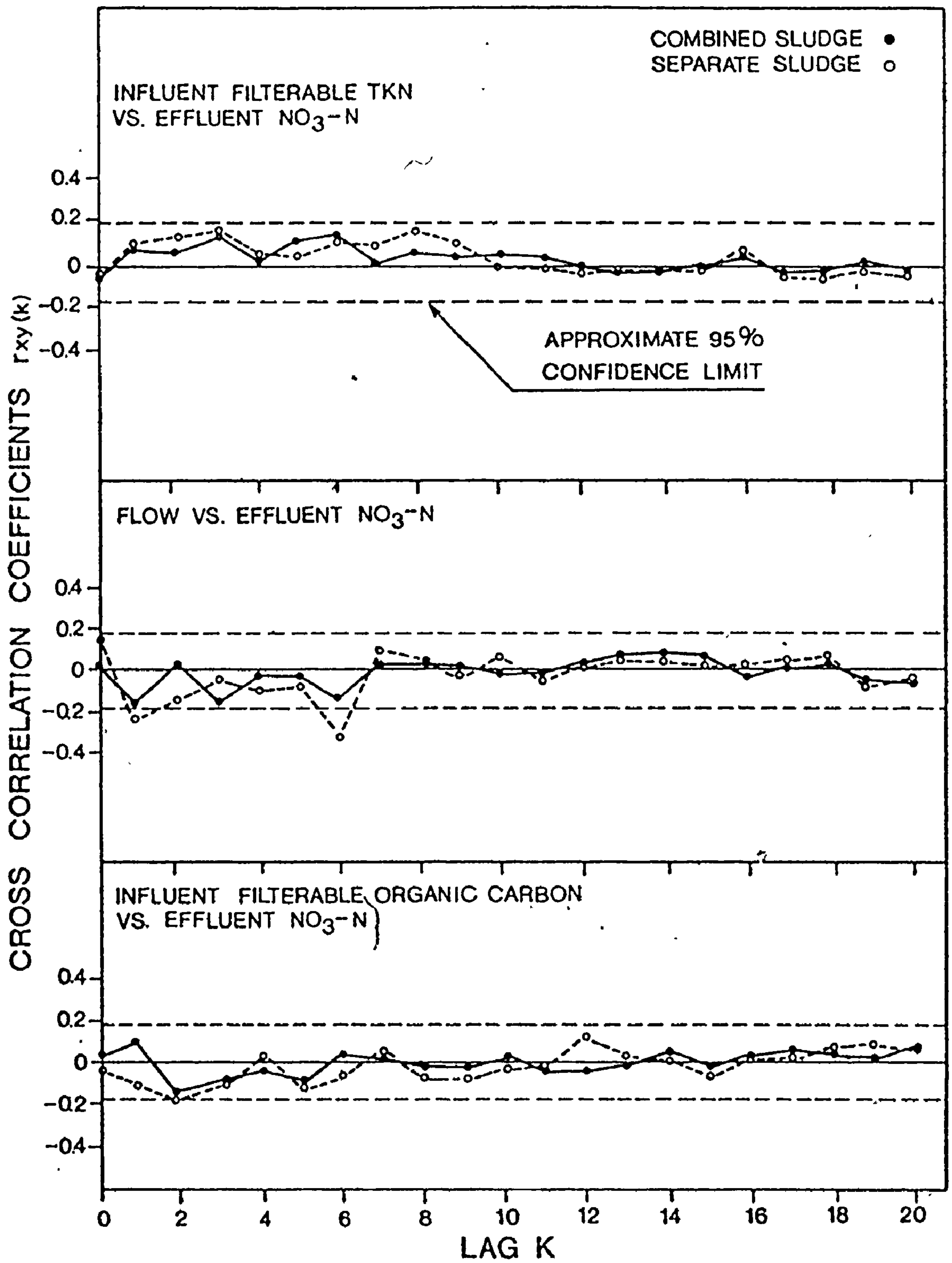


FIG. 26 CROSS CORRELATION RESULTS FOR EFFLUENT NITRATE NITROGEN

TABLE 14 TRANSFER FUNCTION - NOISE MODELS DESCRIBING OBSERVED EFFLUENT TKN AND NITRATE-NITROGEN

Variable	System	Model
Filterable TKN	Combined	$Y_t = \frac{0.011}{1-0.786\beta} X1_{t-1} + \frac{1}{1-1.066\beta + 0.336\beta^2} a_t$
	Separate	$Y_t = \frac{0.012 + 0.008\beta}{1 - 0.550\beta} X1_{t-1} + \frac{1}{1-1.394\beta + 0.540\beta^2} a_t$
NO_3^--N	Combined	$Y_t = 0.051\ X2_{t-3} - \frac{0.003}{1-0.744\beta} X3_{t-3} + \frac{1}{1-0.889\beta} a_t$
	Separate	$Y_t = 0.049\ X2_{t-3} - \frac{0.004}{1-0.815\beta} X3_{t-1} + \frac{1}{1-1.127\beta + 0.221\beta^2} a_t$

where X_1 = TKN (filterable) loading (g/day),
X_2 = Influent TKN (filterable) concentration (mg/l), and
X_3 = OC (filterable) loading (g/day).

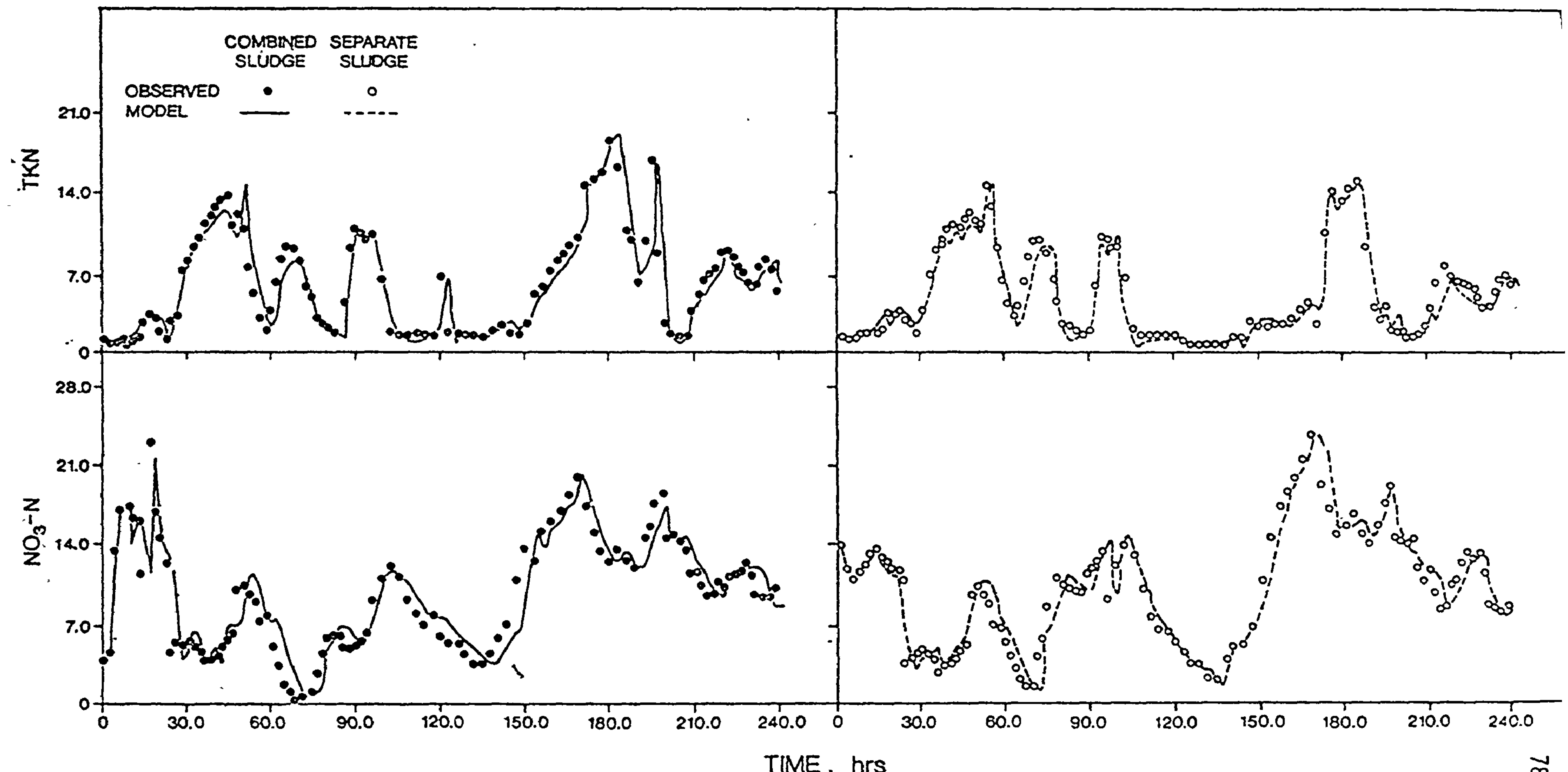


FIG. 27 OBSERVED AND MODEL RESULTS FOR EFFLUENT TKN AND NITRATE NITROGEN

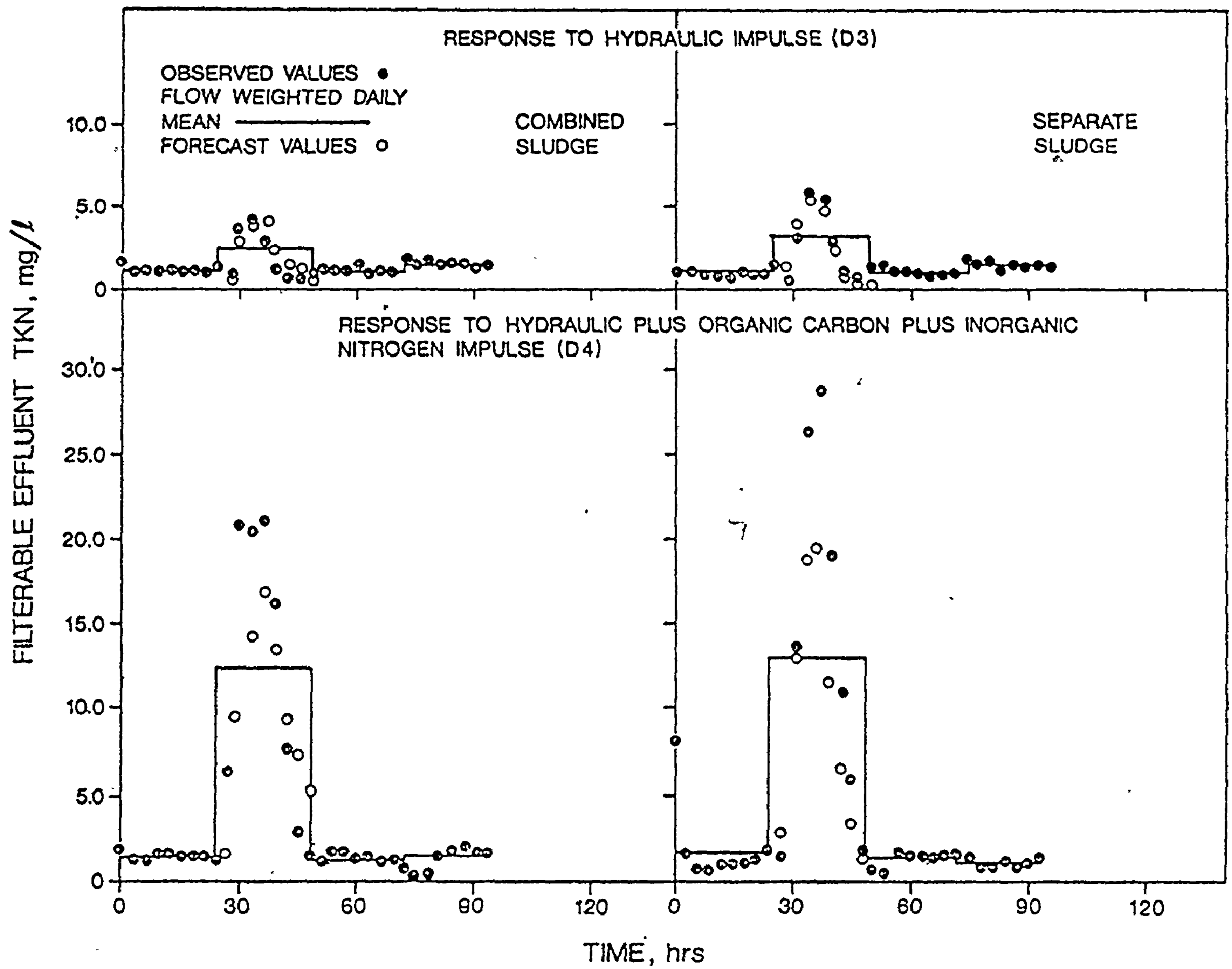


FIG. 28 OBSERVED AND FORECASTED RESPONSE TO IMPULSE LOADINGS

stage combined sludge system (FSC) was found to be less than 0.2 (Appendix D). The NO_3^--N results (Figure 29) verify that a shock loading condition has a greater impact on a nitrifying system with a mixing regime approaching plug flow. This same observation has been reported for full-scale complete mix and plug flow systems operated in parallel for BOD removal (Toerber, Paulson, and Smith, 1974).

To determine how appropriate the discrete transfer function noise models developed from experiment D5 are as a predictive tool, the effluent filterable TKN response during D3 and D4 was forecast. The models developed (Table 14) were based on two hour analytical results and must be altered to account for the sampling interval of three hours used in the non-steady experiments. The revised filterable TKN models (Table 15) were used to forecast the response of the combined (SSC) and separate sludge system (TSS) to the impulse loading conditions imposed during experiments D3 and D4. The response and recovery times showed good agreement (Figure 28). The magnitude of the response for experiment D4 was under-estimated. The impulse loading condition imposed during this experiment was beyond that encountered in the experiment D5 from which the models were developed. This could account for the difference between forecast and observed results. Details concerning the model revision procedures and forecasting methods are included in Appendix F.

The dynamic response of the combined ~~and~~ separate sludge systems to step changes in flow rate, organic carbon and inorganic nitrogen was investigated in experiments D6, D7 and D8. The step changes were initiated following observation of the performance of the systems for 24 hours under baseline conditions (Table 5).

In response to a doubling in flow rate, both systems increased in effluent filterable TKN corresponding to a decrease in removal (Figure 30). The pseudo "steady-state" relationships developed predict an independence of TKN removal and hydraulic retention time providing the solids retention time is maintained. Following an initial response, the combined sludge system performance verifies this relationship as a slightly lower removal level is established corresponding to a lower SSRT at the new pseudo "steady-state" (Figure 30). The response in terms of effluent nitrate

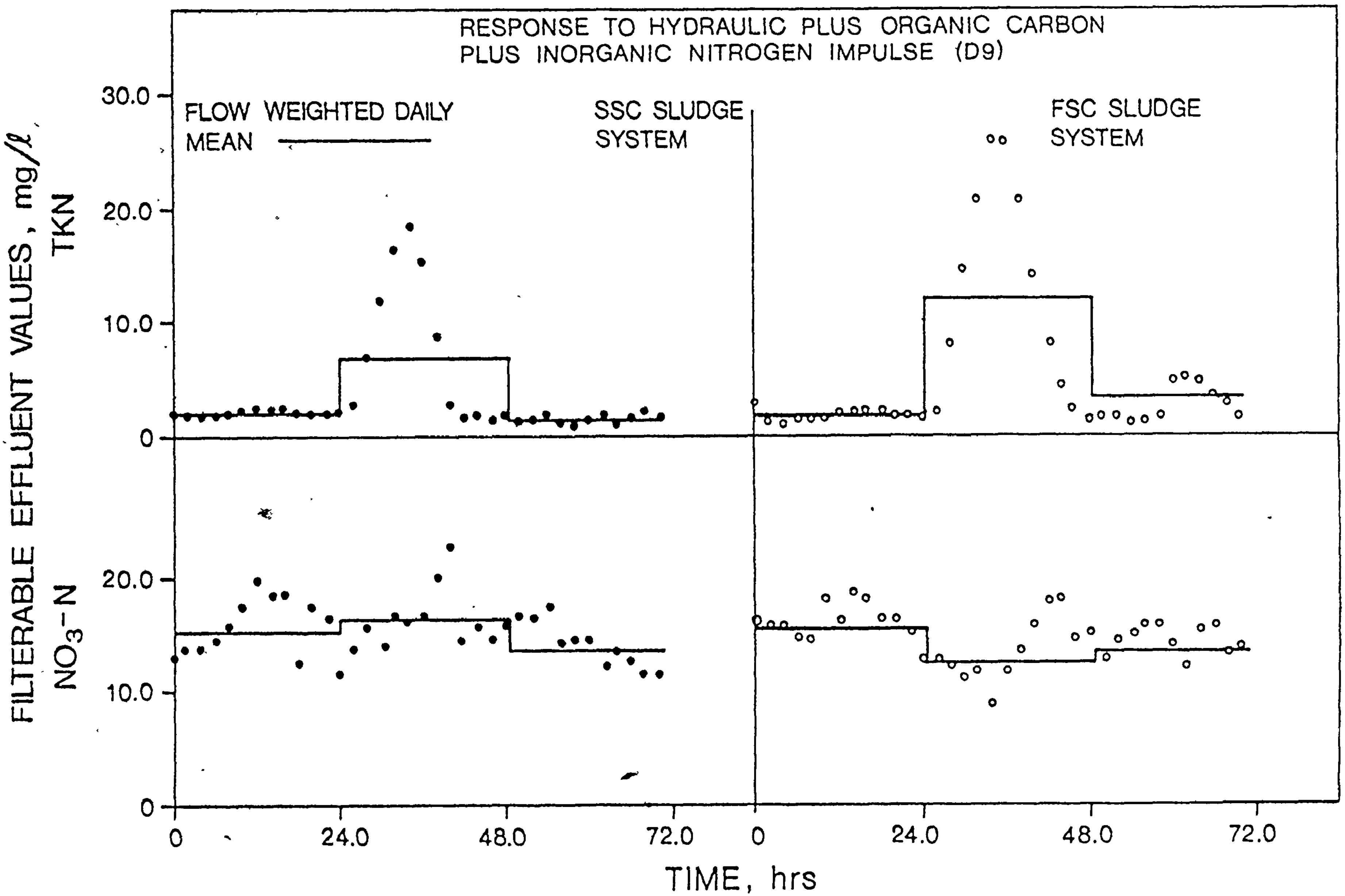


FIG. 29 RESPONSE OF COMPLETE MIX AND PLUG FLOW NITRIFYING SYSTEMS TO IMPULSE LOADING CONDITIONS

TABLE 15 TRANSFER FUNCTION - NOISE MODELS FOR THREE HOUR SAMPLING INTERVAL

Variable	System	Model
Filterable TKN	Combined	$Y_t = \frac{0.0156}{1-0.697\beta} X_{1_{t-1}} + \frac{1}{1-0.7254\beta + 0.195\beta^2} a_t$
	Separate	$Y_t = \frac{0.020 + 0.006\beta}{1-0.408\beta} X_{1_{t-1}} + \frac{1}{1-1.116\beta + 0.3964\beta^2} a_t$

where X_1 = TKN (filterable) loading (g/day).

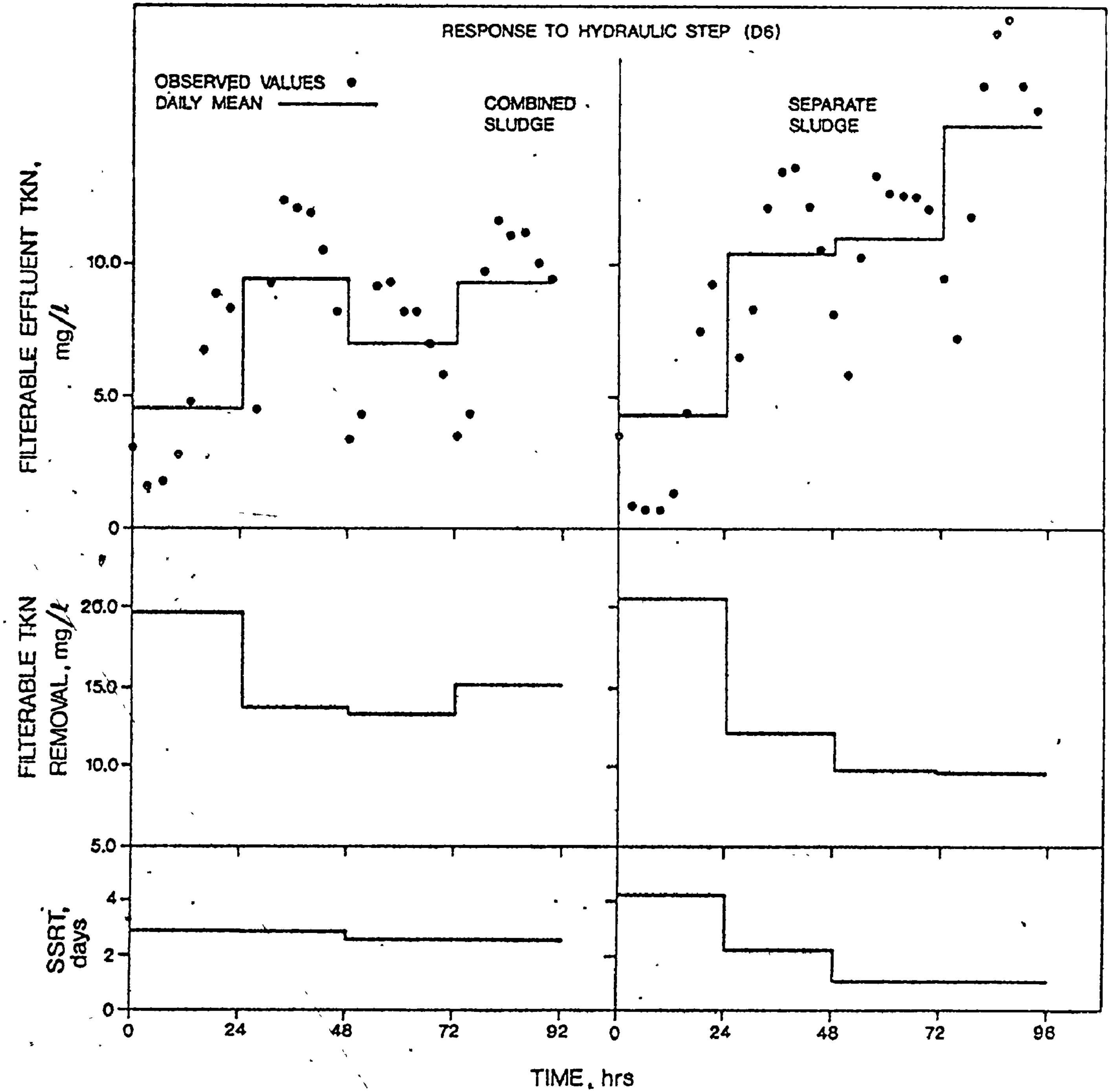


FIG. 30 OBSERVED RESPONSE TO HYDRAULIC STEP

was quite similar verifying the independence of nitrification and HRT (Appendix B). The decrease in filterable TKN removal in the separate sludge system (Figure 30) corresponds to a decrease in SSRT. The decrease in SSRT was caused by the loss of volatile solids in the nitrifying reactor (B2) through increased clarifier effluent suspended solids.

The organic carbon step imposed in D7 resulted in a doubling of the influent filterable BOD. The observed filterable TKN removal indicated an apparent delayed negative response both in the combined and separate sludge systems (Figure 31). This is likely not a true response but is due to a naturally occurring decrease in the influent filterable TKN concentration, limiting the TKN removal as evidenced by the low effluent values (Figure 31). This is supported by the filterable TKN removal results over the last 24 hour period. By maintaining the same system solids residence time (Figure 31), which involved increasing reactor volatile suspended solids together with increasing solids wasting from the reactors, the same number of nitrifiers was maintained and consequently the same filterable TKN removal resulted. This supports the contention that nitrification systems operating under similar environmental conditions (reactor pH, DO, and temperature) will contain the same number of nitrifiers at equal SRT's regardless of the C/N ratio.

In experiment D8 the inorganic nitrogen step imposed on the natural diurnal influent concentration, resulted in an apparent increase in filterable TKN removal (Figure 32) during the first day of addition (24 to 48 hr). For the combined sludge system, the removal results during the following days indicate that this response is likely associated with the system delay. The performance verifies that the combined sludge system was initially operating under critical nitrification conditions after which the same absolute amount of filterable TKN was removed at the stable SSRT conditions. This constant degree of nitrification is verified by equal daily mean effluent NO_3^--N values during the experiment (Appendix B). The separate sludge system during D8 operated at a significantly higher SSRT due to an experimental error and therefore initially was not

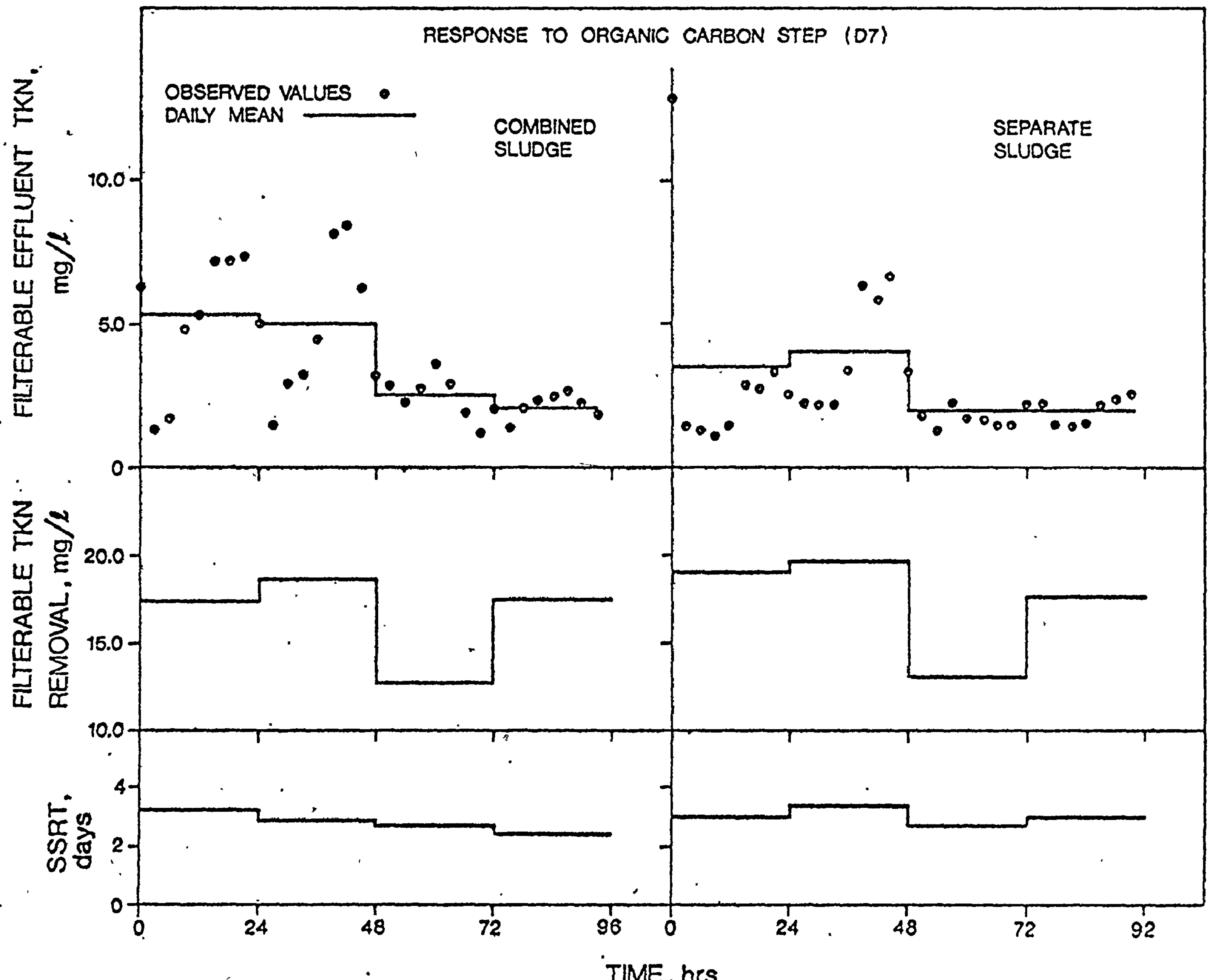


FIG. 31 OBSERVED RESPONSE TO ORGANIC CARBON STEP

at critical nitrification conditions as evident from the effluent results (Figure 32) during day one (0 to 24 hr). Consequently, an increased degree of filterable TKN removal occurred following the nitrogen step. This result is verified by a corresponding increase in the level of effluent NO_3^--N (Appendix B).

System response to natural diurnal variations in flow and concentration

The step forcings and impulse loading conditions imposed during the non-steady experiments allow us to assess how combined and separate sludge systems operating under critical nitrification conditions respond to sudden changes in influent conditions and changes in the pseudo "steady-state" levels of the input variables. In establishing design criteria for wastewater treatment plants the response to the natural diurnal variation in flow and concentration normally encountered at a wastewater treatment plant is an important consideration. This response can be examined by reference to the baseline day results of the non-steady experiments.

The baseline influent TKN levels during experiments D3 and D6 (Figure 33) represent extremes in the natural concentrations encountered. The resultant TKN loadings lead to a significantly different effluent filterable TKN response (Figure 33) for both the combined and separate sludge systems even though the experimental SSRT (three days) and temperature (13^{o} to 15^{o}C) conditions were similar. The daily mean effluent filterable TKN values during these baseline days (Figures 28 and 30) can be predicted approximately by use of the pseudo "steady-state" TKN removal relationships developed at SSRT's of four days (Figures 17 and 18). In experiment D3 the predicted values for both the combined and separate sludge systems correspond to the residual filterable organic nitrogen concentration (0.7 mg/l) identified previously (Figure 11). In experiment D6 the predicted values are 4.8 and 4.0 mg/l filterable TKN for the combined and separate sludge systems respectively. These predicted values correspond quite closely to the observed daily mean results (Figures 28 and 30) during the baseline days.

In order to reduce the filterable effluent TKN variation in experiment D6 a greater SSRT would be necessary according to the pseudo

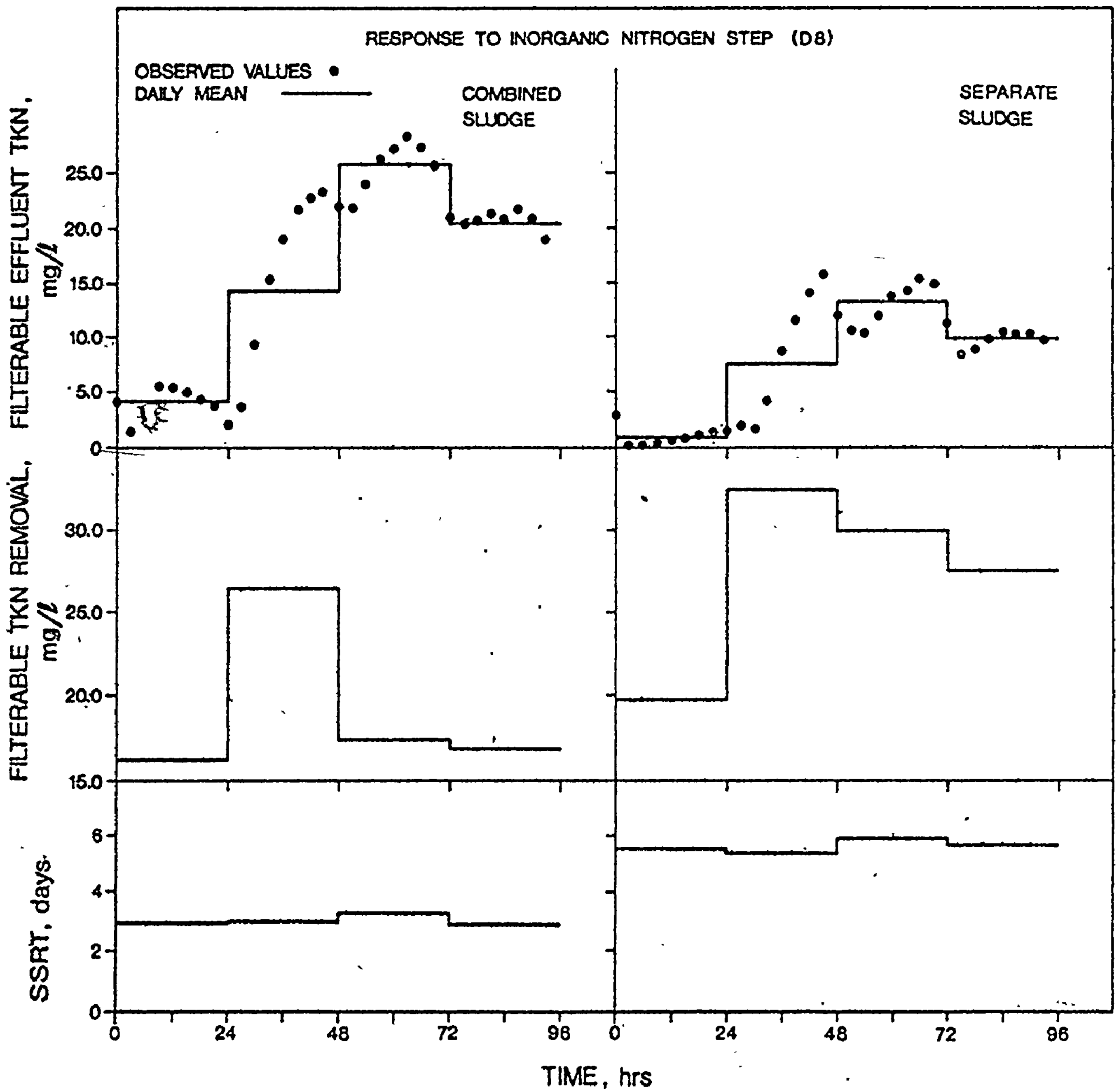


FIG. 32 OBSERVED RESPONSE TO INORGANIC NITROGEN STEP

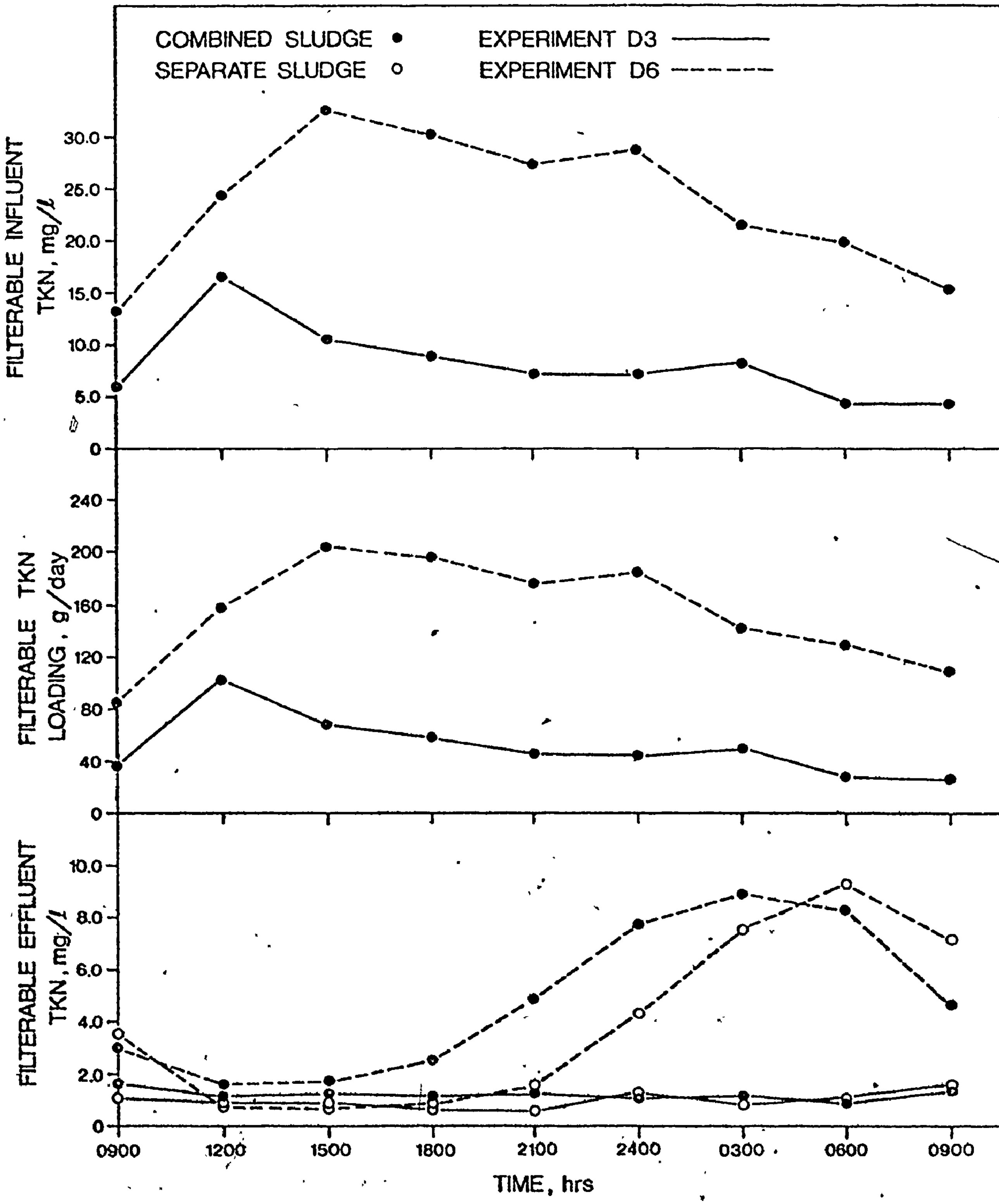


FIG. 33 OBSERVED RESPONSE TO NATURAL DAILY CONCENTRATION VARIATION

"steady-state" relationships developed. This is verified by reference to the baseline day results for the separate sludge system in experiment D8 (Figure 32). The influent loading conditions were comparable to that encountered in experiment D6 but the effluent filterable TKN variation was reduced to the residual level (Figure 34).

In addition to experimental observation, the dynamic models developed in experiment D5 can be used to examine the response of the combined and separate sludge systems to natural influent concentration variations. The transfer function component of a TF-N model (equation 18) expresses the deterministic nature of the particular process. The noise model accounts for the unexplained output variations. Therefore the effluent variation due to the nature of the combined and separate sludge processes is determined from the transfer function model results.

By simulating the influent conditions encountered during the baseline days of experiments D3 and D6 the filterable TKN effluent variation was predicted using both the transfer function models and the combined transfer function-noise models. The transfer function models predict no significant filterable effluent TKN response in the combined or separate sludge systems for the influent conditions approximated from D3 (Figure 35). These results support the observed values (Figure 33). Simulating the influent conditions encountered in experiment D6, both the transfer function and combined TF-N models predict a significant filterable effluent TKN response for both SSC and TSS sludge systems (Figure 35). The observed effluent variation (Figure 33) over the twenty-four hour period is better predicted by the TF-N models. Details concerning the simulation and prediction methods are included in Appendix F.

The TF-N models were used to examine the response of the carbon removal nitrification systems to natural concentration and flow variation. In simulating hydraulic input conditions, the flow pattern and extent of variation chosen (maximum to average to minimum equal to 1.6:1.0:0.5) were representative of that to the Burlington Skyway Treatment Plant. The mean daily flow was set at the value maintained during the baseline days of the dynamic experiments (4.55 l/min). The simulated level and variation

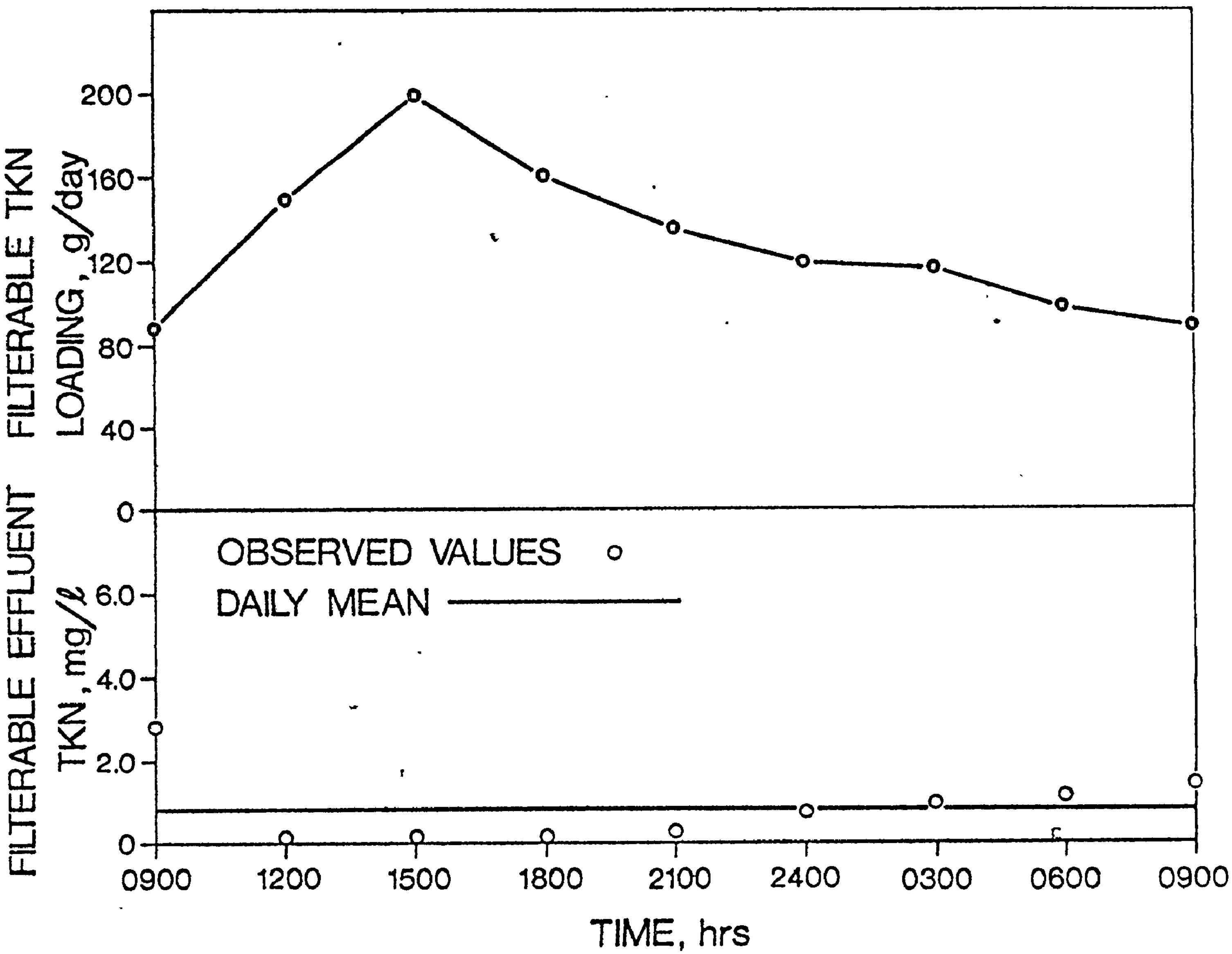


FIG. 34 RESPONSE OF SEPARATE SLUDGE SYSTEM TO D8 BASELINE DAY INPUT

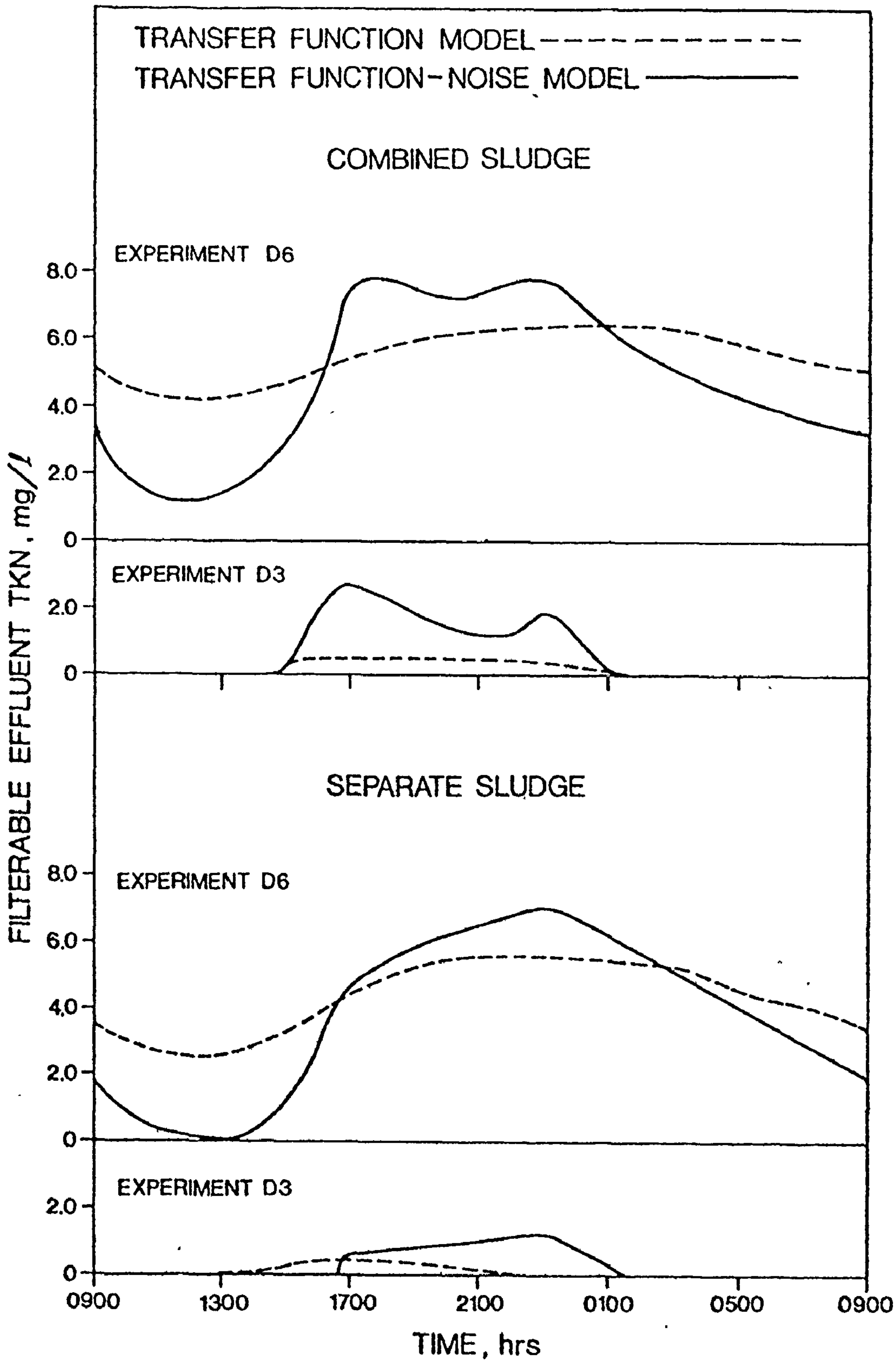


FIG. 35 PREDICTED RESPONSE TO SIMULATED DAILY CONCENTRATION VARIATION

in filterable TKN concentrations was that representing the D6 conditions. In response to these superimposed loading conditions, the TF-N model for the combined sludge system (SSC) predicts a greater effluent variation than for the variable concentration input alone (Figure 36). A similar result was found for the separate sludge system. Although a greater hourly variation in filterable TKN concentration is predicted, little difference exists in the calculated daily mean results (Figure 36) based on flow-weighted sampling. This would indicate that the relationships previously developed representing the daily mean filterable TKN removal performance under pseudo "steady-state" conditions may be used to determine results under variable flow conditions. This contention is supported by the observed results during a screening experiment in Phase 3 (Jan. 1975). In this experiment a sinuoidal flow pattern was superimposed upon the natural concentration variation (Figure 37). The observed response of the combined sludge system (Figure 37) was predicted closely by the pseudo "steady-state" relationship (Figure 17).

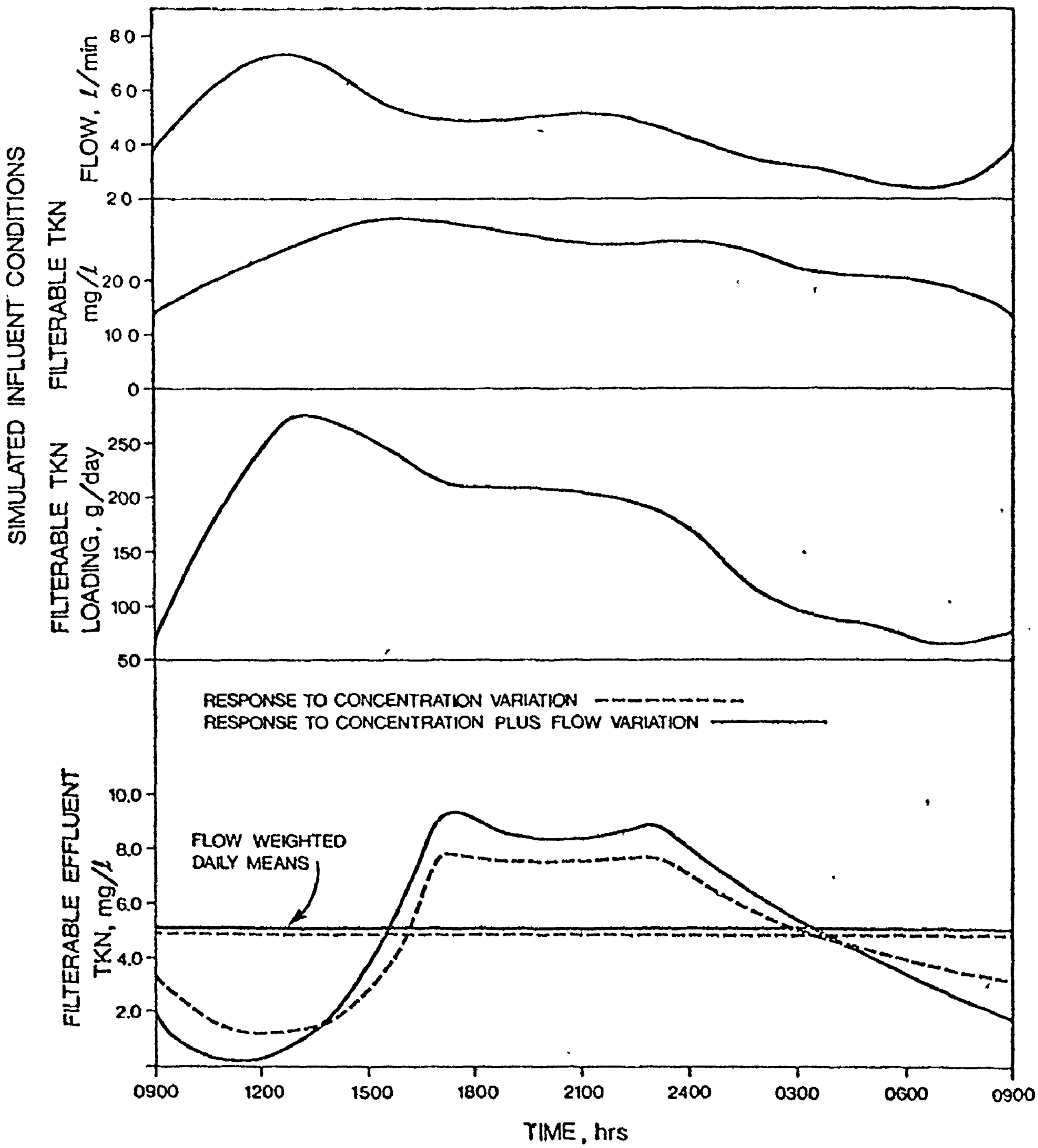


FIG. 36 PREDICTED RESPONSE TO SIMULATED DAILY CONCENTRATION AND FLOW VARIATION

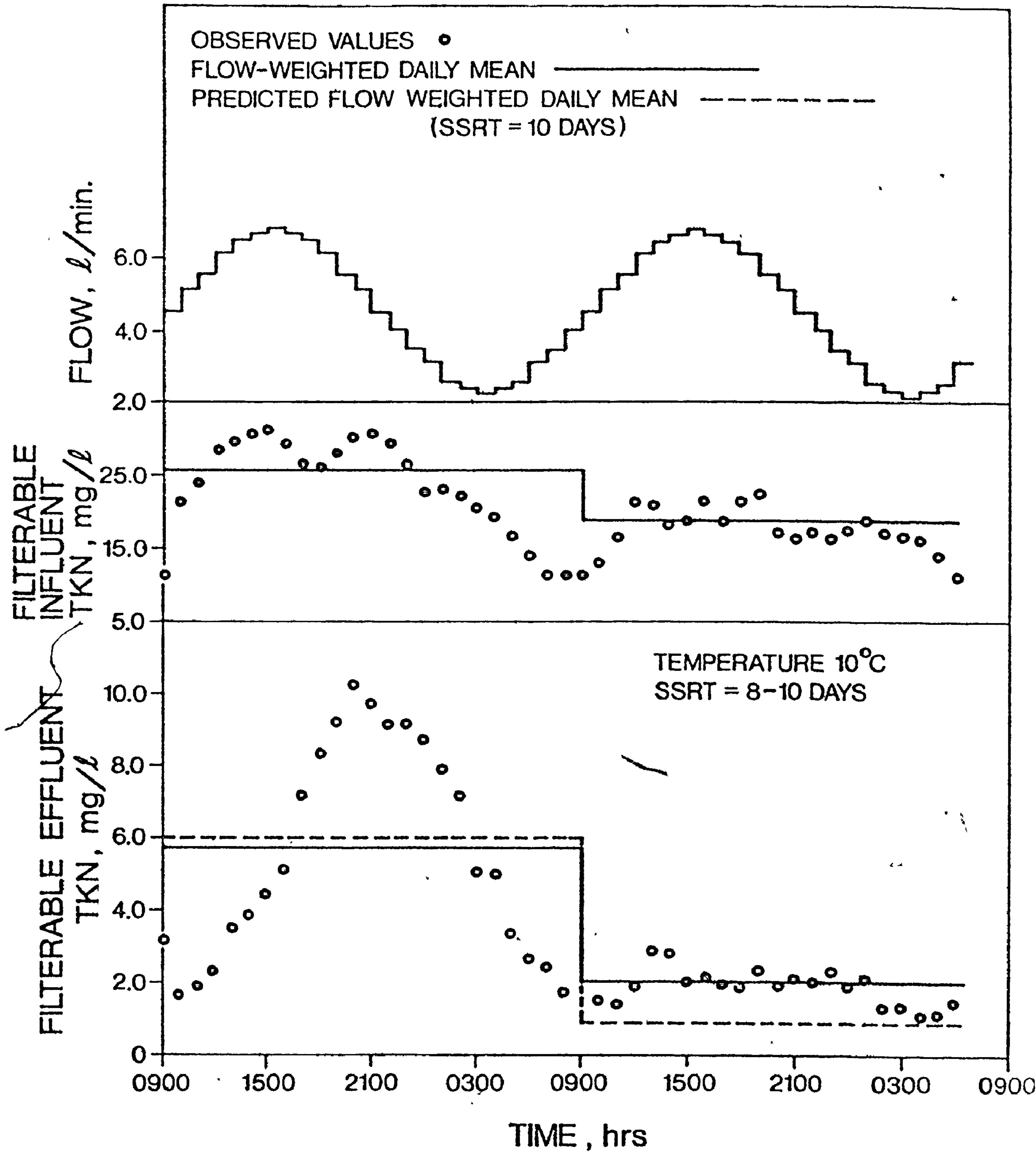


FIG. 37 RESPONSE OF COMBINED SLUDGE SYSTEM TO DAILY CONCENTRATION AND FLOW VARIATION

CONCLUSIONS

This study, conducted under pseudo "steady-state" and non-steady conditions, supports the hypothesis that biological nitrification is feasible employing combined or separate sludge systems even under cold climatic conditions.

It may be concluded that under pseudo "steady-state" conditions:

1) Equal degrees of nitrification can be accomplished in combined or separate sludge nitrification systems.
2) For nitrogen levels commonly found in domestic wastewater, the rate of nitrification, expressed as the filterable TKN removed per unit mass of activated sludge, is independent of the concentration of filterable TKN down to values greater than 1.0 mg/l.
3) Even with complete nitrification an average value of approximately 1.0 mg/l of organic nitrogen can be expected in the filterable fraction of the effluent.
4) Temperature and solids residence time significantly effect filterable TKN removal in combined and separate sludge systems. Nitrification is essentially independent of hydraulic residence time.
5) A separate sludge system will produce a significantly greater amount of sludge compared to a combined sludge system.

An evaluation of the response of combined and separate sludge systems to non-steady influent conditions indicates that:

1) A pulse change in influent pH will cause a lower reactor pH but of shorter duration in a separate sludge system. The accompanying increase in effluent concentration of both filterable TKN and COD will be less.
2) For a step down in temperature, the increase in effluent filterable TKN concentration for a separate sludge system will be considerably slower than that of a combined sludge system.
3) Transfer function models together with time series models adequately describe both combined and separate sludge systems

operating under critical nitrifying conditions and are able to forecast the temporal variation in nitrification achieved.

4) The models developed for both separate and combined sludge systems indicate:

a) effluent filterable TKN concentration increases with filterable TKN loading but does not respond significantly to OC loading, and

b) effluent nitrate-N increases with filterable influent TKN concentration and decreases with influent filterable OC loading.

5) A greater effluent filterable TKN variation can be expected from nitrifying systems operated under variable flow and concentration inputs than for variable concentration inputs alone. The pseudo "steady-state" relationships can predict the daily mean effluent results based on flow-weighted sampling.

RECOMMENDATIONS FOR FUTURE WORK

1) A detailed investigation at the pilot scale level aimed at developing design criteria for total nitrogen removal in combined sludge nitrification and denitrification systems.
2) Develop and demonstrate the applicability of dynamic models for nitrifying activated sludge systems over a wide range of process conditions (temperature, solids retention time, etc.). These models may take the form of simple empirical transfer function-noise models or may be composed of deterministic and stochastic functions.
3) Investigate the feasibility of employing simple transfer function-noise models to describe the dynamic behaviour of existing full-scale wastewater treatment plants and applying them as a tool for process control and design extension.

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APPENDIX A

Deterministic Dynamic Model for SSC System

In modelling the SSC system, substrate and material balances are presented under the assumptions as presented in the section "Deterministic Dynamic Models."

Substrate balances

a) Filterable degradable organic carbon:

$$V_1 \frac{d S_1^C}{dt} = F_o S_o^C + (F_{R1} - F_{W1}) S_1^C - F_1 S_1^C$$

$$- \frac{u^H X_1^H V_1}{Y^H} \qquad \text{..........(23)}$$

$$F_1 = F_o + F_{R1} - F_{W1}$$

$$F_{R1} - F_{W1} = F_1 - F_o \qquad \text{..........(24)}$$

equation (23) becomes:

$$V_1 \frac{d S_1^C}{dt} = F_o S_o^C - F_o S_1^C - \frac{u^H X^H V_1}{Y^H} \qquad \text{..........(25)}$$

where, $u^H = K_G^H S_1^C$, and

K_G^H = linear growth coefficient for heterotrophs (T^{-1})

b) Ammonia nitrogen:

$$V_1 \frac{d S_1^{NH_4}}{dt} = F_o S_o^{NH_4} + (F_{R1} - F_{W1}) S_1^{NH_4} - F_1 S_1^{NH_4}$$

$$- \frac{u^{NS} X_1^{NS} V_1}{Y^{NS}} - .14 \frac{u^H X_1^H V_1}{Y^H} \qquad ....(26.)$$

using equation (24), equation (26) becomes:

$$V_1 \frac{d S_1^{NH_4}}{dt} = F_o S_o^{NH_4} - F_o S_1^{NH_4} - \frac{u^{NS} X_1^{NS} V_1}{Y^{NS}}$$

$$- .14 \frac{u^H X_1^H V_1}{Y^H} \qquad ....(27)$$

where, the substrate utilization term u^{NS} is expressed by:

$$u^{NS} = u^{*NS} \frac{S_1^{NH_4}}{(K_s^{NS} + S_1^{NH_4})}$$

u^{*NS} = maximum growth rate coefficient (T^{-1}), and

K_s^{NS} = substrate concentration at one half maximum growth rate (M/L^3).

In the above substrate balance, the rate of disappearance due to heterotrophic growth is estimated from considering the heterotrophs to be represented by the composition $C_5H_7NO_2$ (Hoover and Porges, 1952).

c) Nitrite nitrogen:

$$V_1 \frac{d S_1^{NO_2}}{dt} = F_o S_o^{NO_2} + (F_{R1} - F_{W1}) S_1^{NO_2} - F_1 S_1^{NO_2}$$

$$+ \frac{u^{NS} X_1^{NS} V_1}{Y^{NS}} - \frac{u^{NB} X_1^{NB} V_1}{Y^{NB}} \qquad ....(28)$$

using equation (23), equation (27) becomes:

$$V_1 \frac{d\, S_1^{NO_2}}{dt} = F_o\, S_o^{NO_2} - F_o\, S_o^{NO_2} - \frac{u^{NS}\, X_1^{NS}\, V_1}{Y^{NS}} - \frac{u^{NB}\, X_1^{NB}\, V_1}{Y^{NB}} \qquad \text{..........(29)}$$

where the substrate utilization term u^{NB} is expressed by:

$$u^{NB} = u^{*NB} \frac{S_1^{NO_2}}{(K_s^{NB} + S_1^{NO_2})}$$

u^{*NB} = maximum growth rate coefficient (T^{-1}), and

K_s^{NB} = substrate concentration at one half maximum growth rate (M/L^3).

d) Nitrate nitrogen:

$$V_1 \frac{d\, S_1^{NO_3}}{dt} = F_o S_o^{NO_3} + (F_{R1} - F_{W1})\, S_1^{NO_3} - F_1\, S_1^{NO_3} + \frac{u^{NB}\, X_1^{NB}\, V_1}{Y^{NB}} \qquad \text{..........(30)}$$

using equation (23), equation (29) becomes:

$$V_1 \frac{d\, S_1^{NO_3}}{dt} = F_o\, S_o^{NO_3} - F_o S_1^{NO_3} + \frac{u^{NB}\, X_1^{NB}\, V_1}{Y^{NB}} \qquad \text{..........(31)}$$

Organism balances

Assuming the concentration of organisms in the feed stream is negligible ($X_o = 0$), mass balances for heterotrophs, Nitrosomonas, and Nitrobacter can be written as:

$$V_1 \frac{d X_1^H}{dt} = (F_{R1} - F_{W1}) X_{R1}^H - F_1 X_1^H + V_1(u^H - K_D^H) X_1^H \quad \text{..........(32)}$$

$$V_1 \frac{d X_1^{NS}}{dt} = (F_{R1} - F_{W1}) X_{R1}^{NS} - F_1 X_1^{NS} + V_1 (u^{NS} - K_D^{NS}) X_1^{NS} \quad \text{......(33)}$$

$$V_1 \frac{d X_1^{NB}}{dt} = (F_{R1} - F_{W1}) X_{R1}^{NB} - F_1 X_1^{NB} + V_1 (u^{NB} - K_D^{NB}) X_1^{NB} \quad \text{......(34)}$$

where, K_D^H = decay coefficient for heterotrophs (T^{-1}),

K_D^{NS} = decay coefficient for Nitrosomonas (T^{-1}), and

K_D^{NB} = decay coefficient for Nitrobacter (T^{-1}).

Representing the settler performance by an efficiency E_1, operation is according to:

$$X_2^H = (1.0 - E_1) X_1^H \quad \text{..........(35)}$$

$$X_2^{NS} = (1.0 - E_1) X_1^{NS} \quad \text{..........(36)}$$

$$X_2^{NB} = (1.0 - E_1) X_1^{NB} \quad \text{..........(37)}$$

A solids balance around the settler yields:

$$F_1 X_1^H = F_2 X_2^H + F_{R1} X_{R1}^{NH}$$

and applying equation (35) leads to:

$$F_1 X_1^H = F_2 (1.0 - E_1) X_1^H + F_{R1} X_{R1}^H \quad \text{..........(38)}$$

The value of E_1 can be determined according to:

$$E_1 = \frac{X_1 - X_2}{X_1} \quad \text{..........(39)}$$

Substituting equation (37) into the organism balance equation (31) and rearranging the result is:

$$V_1 \frac{d X_1^H}{dt} = V_1 X_1^H (u^H - K_D^H) - F_{W1} X_{R1}^H - F_2 (1.0-E_1) X_1^H \quad \ldots\ldots\ldots\ldots(40)$$

The same expressions are applicable in terms of Nitrosomonas and Nitrobacter.

In summary, the important relationships describing the dynamic operation of the single-stage alternative appear in the information flow diagram (Figure 2).

Parameter Values for Dynamic Models

Before the equations which comprise the proposed dynamic models can be solved, values for the various parameters must be determined.

In the proposed models describing organic carbon degradation and resulting heterotrophic growth, values for the substrate utilization coefficient K_G^H and decay coefficient K_D^H, must be known or assumed. During steady-state simulation studies, Tan (1972), determined these values using a biological culture derived from an activated sludge plant treating the same raw sewage. Because the emphasis in this study is on nitrification, his values could be assumed sufficient for use in the organic carbon utilization and heterotrophic growth functions.

The u^* and K_s values in the Monod models for nitrification can be determined by various methods.

Determinations from pseudo "steady-state" studies, previously discussed, can be used to derive the parameter values. For example considering the single-stage carbon removal-nitrification alternative, at steady-state, equation 26 becomes:

$$F_o(S_o^{NH_4} - S_1^{NH_4^*}) = \frac{u^{NS} X_1^{NS} V_1}{Y^{NS}}, \quad \ldots\ldots\ldots\ldots(41)$$

$$\text{where, } u^{NS} = u^{*NS} \frac{S_1^{NH_4^*}}{K_s^{NS} + S_1^{NH_4}} \quad \ldots\ldots\ldots\ldots(42)$$

substituting equation 41 into 40 and rearranging leads to:

$$\frac{T_1 X_1^{NS}}{S_o^{NH_4} - S_1^{NH^*_4}} = \frac{Y^{NS} K_s^{NS}}{u^{*NS}} \frac{1}{S_1^{NH^*_4}} + \frac{Y^{NS}}{u^{*NS}}, \quad \ldots\ldots\ldots\ldots(43)$$

where, $T_1 = \frac{V_1}{F_o}$, and $S_1^{NH^*_4}$ is the corrected effluent ammonia concentration representing the concentration resulting if heterotrophic growth and subsequent nitrogen uptake did not occur. A graphical method can then be used to determine K_s^{NS} and u^{*NS} knowing Y^{NS} , from operating over a range of F_o values.

Batch studies can be used to determine the kinetic parameter values. For ammonia utilization by Nitrosomonas, the batch process equations are:

$$\frac{d\,S^{NH_4}}{dt} = \frac{u^{*NS}\, S^{NH_4}\, X^{NS}}{Y^{NS}(K_s^{NS} + S^{NH_4})} \quad \text{, and} \quad \ldots\ldots\ldots\ldots(44)$$

$$\frac{d\,X^{NS}}{dt} = \frac{u^{*}\, S^{NH_4}\, X^{NS}}{K_s^{NS} + S^{NH_4}} - K_D^{NS}\, X^{NS} . \quad \ldots\ldots\ldots\ldots(45)$$

The kinetic coefficients in these equations can be determined by a computer simulation of the unsteady-state equations. For a given set of initial parameter values, the simulation will produce curves of X^{NS} and S^{NS} versus time. Values of Y^{NS} and K_D^{NS} will be supplied as input and therefore are not part of the parameter set. Both the above batch and previously developed continuous time-dependent equations require initial values for the organism concentrations. Determination of these initial values can be afforded by developing a relationship, through batch experiments, between ammonia removal rate and percent Nitrosomonas present.

The above parameter determination procedures are applicable as well to the carbon and nitrite substrates involved and the corresponding heterotrophic and Nitrobacter organisms groups. A more direct procedure for determining an initial estimate of the heterotrophic population would be through the use of oxygen uptake measurements in which nitrification was inhibited (Toerber, 1972).

Applying kinetic coefficients determined from batch or continuous pseudo"steady-state"studies assumes that they are applicable to transient conditions.

Another method of determining the parameters for the models developed, involves utilizing an optimization search routine along with the particular dynamic simulation method. The search routine determines the parameter values which give the best fit to the transient data.

Yield and decay coefficients for the nitrifying bacteria are quite small making experimental determination difficult. A review of the literature may be used to determine these values.

APPENDIX B

Solids Retention Time (SRT) Calculation

The solids retention time for each reactor-clarifier system is defined as the solids in the aeration tank divided by the solids intentionally wasted or lost over the clarifier weir per day. During pseudo "steady-state" period the calculated SRT is based on a cumulative mean aeration tank MLSS concentration and total solids wasted or lost from the system. For the combined sludge systems (SSC, TSC, FSC), the final result is the system solids retention time (SSRT) for that pseudo "steady-state" period (Table B1). For the separate sludge system (TSS) the SRT for B1 and B2 were calculated in the above manner. The TSS system solids retention time (SSRT) was then calculated weighting the individual SRT's for B1 and B2 according to their aeration tank volumes (Table B1). The dates over which the SSRT was calculated during each pseudo "steady-state" period are indicated in the "Data Listing" section under "Mode of Operation" (Appendix B).

Analytical Procedures

Total kjeldahl nitrogen

Total kjeldahl nitrogen analyses (organic plus ammonia nitrogen) were performed according to Technicon Auto-analyser Industrial Method 146-71A. Essentially this procedure consists of digestion of organic matter at 380^{o}C followed by measurement of the ammonia produced using the Berthelot reaction in which the formation of a blue indophenol complex occurs when ammonia reacts with sodium phenate followed by the addition of sodium hypochlorite. Glycine standards were used for calibration. For keeping unfiltered samples homogenized in the sample cups the system has two air aspirators. One aspirator provides complete mixing in the cup being sampled while the second aspirator mixes the next cup on the tray.

.BLE B1 SOLIDS RETENTION TIME CALCULATIONS - RUNS PSS - 21 AND - 22

TSC SYSTEM

Date	Aeration Tank MLSS g/l A1	A2	*A	†Cumul. Mean A	Mean Plant Solids g	Intentional Wasting Waste Vol. l	Waste Conc. g/l	Solids Waste g	Unintentional Wasting g	Total Waste g	Cumul. Total Waste g	Cumul. SRT days
(1974)												
17/6	6.47	7.49	7.14	7.14	15593.8	45.5	10.26	466.8	104.8	2099.2	2099.2	7.8
						47.8	9.92	474.2				
						95.5	11.03	1053.4				
18/6	5.94	5.795	5.84	6.49	14178.5	91.0	9.93	903.6	146.8	2489.7	4588.9	6.2
						138.8	10.37	1439.3				
19/6	5.91	5.51	5.65	6.21	13562.6	95.5	9.19	877.6	188.7	1728.1	6317.0	6.4
						63.7	10.39	661.8				
20/6	6.02	5.885	5.93	6.14	13409.8	113.8	10.13	1152.8	157.2	1310.0	7627.0	7.0

Note: *A is weighted MLSS according to A1 and A2 tank volumes.
†Cumul. stands for cumulative.

TABLE B1(Cont'd)

TSS SYSTEM: REACTOR B1

Date	Aeration Tank g/l B1	Aeration Tank g/l Cumul.	MLSS Mean B1	Mean Plant Solids g	Intentional Waste Vol. l	WASTING Waste Conc. g/l	WASTING Solids Waste g	Unintentional Wasting g	Total Waste g	Cumul. Total Waste g	Cumul. SRT days
(1974)											
17/6	3.81		3.81	3017.5	159.3	8.69	1384.4	125.8	2869.7	2869.7	1.05
					182	7.47	1359.5				
18/6	3.585		3.69	2928.4	136.5	6.94	947.3	325.0	3306.0	6175.7	0.95
					204.8	9.93	2033.7				
19/6	3.69		3.69	2928.4	159.3	7.37	1174.0	146.8	2913.3	9089.0	0.97
					227.5	7.00	1592.5				
20/6	3.35		3.61	2858.1	182.0	6.60	1201	52.4	2763.1	11852.1	*0.96
					273.0	5.53	1509.7				

TABLE B1 (Cont'd)

TSS SYSTEM: REACTOR B2

Date	Aeration Tank g/l B2	Aeration Tank g/l Cumul.	MLSS Mean B2	Mean Plant Solids g	Intentional Waste Vol. l	WASTING Waste Conc. g/l	WASTING Solids Waste g	Unintentional Wasting g	Total Waste g	Cumul. Total Waste g	Cumul. SRT days
(1974)											
17/6	4.09		4.09	5693.3	35.5	6.65	236.1	125.8	361.9	361.9	15.7
18/6	3.535		3.81	5303.5	68.3	6.36	434.1	109.8	538.9	900.8	11.8
19/6	3.610		3.74	5213.0	68.3	6.37	435.1	188.7	623.8	1529.6	10.3
20/6	3.05		3.57	4971.2	35.5	5.41	192.0	83.9	275.9	1800.5	* 11.0

Note: * TSS system solids retention time (SSRT) $\pm$ $\frac{174\ (.96) + 306\ (11.0)}{480} = 7.4$

Ammonia

Analyses of ammonia nitrogen were conducted using Technicon Auto-analyser Industrial Method 98-70W. This is essentially the same technique employed for Total kjeldahl nitrogen with the omission of the selenium dioxide/sulphuric acid/perchloric acid digestion step which ammonifies the organic nitrogen fraction. Ammonium chloride standards provided calibration.

Nitrite

Technicon Auto-analyser Industrial Method 100-70W was used for nitrite-nitrogen determinations. This technique involves a reaction between nitrite and sulphanilamide under acid conditions to form a diazo compound which in turn is coupled with N-1-naphthylethylenediamine to form a reddish purple azo dye. Colourimetric determination is then made on the sample.

Nitrate plus nitrite

Nitrate plus nitrite-nitrogen analyses were performed using Technicon Auto-analyser Industrial Method 100-70W. In this method, the nitrate-nitrogen is reduced to nitrite in the copper-cadium reduction column. The sample is then analysed for nitrite nitrogen as described previously.

Chemical oxygen demand (COD)

Early COD determinations were done according to the dichromate reflux method described in "Standard Methods" (1971). During the research period, a modified version of Technicon Auto-analyser Industrial Method No. 268-73W was adapted for COD analysis. A Technicon Solidprep 11 sampler was introduced in place of the normal sampler. This allowed analysis of samples containing suspended solids and provided high shear homogenization of samples with the dichromate and sulphuric acid reagents. Standard solutions were prepared using ammonium chloride. The standards were first analysed using the "Standard Methods" reflux technique and then analysed on the Technicon equipment. The standard peaks produced on the Technicon System were then calibrated against the "Standard Methods" results.

This complicated approach was necessary since the sample digestion time in the Auto-analyser was shorter than that in the standard reflux test. This resulted in a lower degree of reaction completion with the Auto-analyser when heterogeneous sewage samples were tested. With this procedure modification in effect, Auto-analyser COD results for sewage samples were generally only 5 to 7 percent lower than results obtained via the "Standard Methods" technique.

Biochemical oxygen demand (BOD)

The 5 day, 20 degree C BOD determinations were performed according to the method described in "Standard Methods" pages 489 - 495 (1971).

Filterable organic carbon (FOC)

Twenty micro-litre samples previously acidified and purged were injected into a Beckman Infrared Carbon Analyser. The resulting peaks were compared to a calibration curve prepared from standards using anhydrous potassium biphthalate.

Suspended solids

Gelman .45 micron glass fibre filters were dried, but not washed, for at least two hours in a 103 degree C oven. They were then cooled in a dessicator and weighed. Suspended solids determinations were made by filtering a minimum of 10 ml of solution through a filter. The filter was then re-dried at 103 degrees for two or more hours, dessicated for 15 minutes and re-weighed. The increase in weight was taken as a measure of the suspended solids.

Dissolved oxygen

An Electronic Instruments Ltd. Dissolved Oxygen Metre Model 15A was used for dissolved oxygen determinations. It was found necessary to calibrate the probe roughly once a week.

Temperature

The D.O. metre also included a temperature probe and this was used for measurement of the feed stream and the reactor temperatures.

pH

pH was measured using an Orion Specific Ion Meter (Model 401) together with Fisher Combination electrodes (Cat. 1e-639-90).

Alkalinity

By using the Orion pH meter, 50 ml samples were titrated to a pH of 4.8 by addition of .02 N sulphuric acid. Results were expressed as mg/l as calcium carbonate.

Data Listing - Mode of Operation, Reactor Operating Results, Analyses

The complete pilot plant data listing, composed of three sections, appears on the following pages. Contained under "Mode of Operation" is a chronological listing of information concerning pilot plant flow rates, operating reactor or mode, and raw sewage characteristics. This section also lists information on plant upsets, identifies acclimation and chemical addition periods, and notes the period over which the SSRT calculation was made for each plant. Contained under "Reactor Operating Results" is a chronological listing of the solids concentrations in the reactors, the waste concentrations and amounts, and other reactor characteristics such as pH, temperature, etc. Some clarifier effluent characteristics are also listed for the reactor system. Contained under "Analyses" is a chronological listing of analytically determined results for the various reactor streams.

The abbreviations and symbols used in the data listing are interpreted in Appendix G.

Mode of Operation

YEAR	DATE DAY	MON	TIME	OPERATING MODE A	OPERATING MODE B	FEED RATES A	FEED RATES B	RETURN SLUDGE RATES A	RETURN SLUDGE RATES B1	RETURN SLUDGE RATES B2	RAW SEWAGE PH	TEMP	SS	HACH NH3N	ALK

OPERATING NOTES

STEADY-STATE CONDITIONS NOT ACHIEVED ON THE FOLLOWING RATE DAYS DUE TO OPERATING PROBLEMS OR OPERATOR ERROR.

DAY	MONTH	YR	PLANT
13	02	74	A AND B
01	03	74	A AND B
15	03	74	A AND B
19	03	74	A AND B
25	03	74	A AND B
03	04	74	A AND B
05	04	74	A AND B
23	04	74	A AND B
25	04	74	A AND B
14	05	74	A AND B
16	05	74	A AND B
23	05	74	A AND B
26	06	74	A AND B
29	08	74	A
12	09	74	A AND B

STEADY-STATE CONDITIONS NOT ACHIEVED ON THE FOLLOWING RATE DAYS DUE TO DISSOLVED OXYGEN CONCENTRATION BEING LESS THAN 2.0 MG/L DURING PART OF DAY.

DAY	MONTH	YR	PLANT
06	09	74	A AND B
10	09	74	A AND B
17	09	74	B
19	09	74	B
25	10	74	A AND B
28	10	74	A AND B

YEAR	DAY	MON	TIME	MODE A	MODE B	FEED A	FEED B	RETURN A	B1	B2	PH	TEMP	SS	HACH NH3N	ALK
73	* MEANS WRONG DILUTION ON BOD, VALUE IS ACTUALLY HIGHER														
73	15/10/73 START-UP OF FACILITIES USING MLSS FROM SKYWAY WATER POLLUTION CONTROL														
73	PLANT														
73	15/10/73 TO 08/11/73 PRELIMINARY EXPERIMENTAL PROGRAM TO WORK OUT OPERATING														
73	PROBLEMS IN RUNNING PLANT A(SSC AND TSC) AND PLANT B(TSS)														
73	08/11/73 ACCLIMATING PLANT A (SSC) AND PLANT B (TSS) TO SSRT OF 7 DAYS AND 5 C														
73	08	11	AM	1	2	2.0	2.0	2.0	1.0	2.1		22.0	113		23?
73	09	11	AM	1	2	2.0	2.0	2.0	1.0	2.1		4.0	192		230
73	10	11	AM	1	2	2.0	2.0	2.0	1.0	2.1					
73	11	11	AM	1	2	2.0	2.0	2.0	1.0	2.1					
73	12	11	AM	1	2	2.0	2.0	2.0	1.0	2.1					
73	13	11	AM	1	2	2.0	2.0	2.0	1.0	2.1		5.5	152		
73	14	11	AM	1	2	2.0	2.0	2.0	1.0	2.1	8.0	4.5	228		
73	15	11	AM	1	2	2.0	2.0	2.0	1.0	2.1	7.6	4.0	347		201
73	SSRT PLANT A AND PLANT B CALCULATIONS FROM 15/11/73 TO 20/11/73														
73	15/11/73 ACCLIMATION COMPLETE														
73	16	11	AM	1	2	2.0	2.0	2.0	1.0	2.1		4.5	134		
73	17	11	AM	1	2	2.0	2.0	2.0	1.0	2.1					
73	18	11	AM	1	2	2.0	2.0	2.0	1.0	2.1					
73	19	11	AM	1	2	2.0	2.0	2.0	1.0	2.1	7.6	3.5	224		194
73	20	11	AM	1	2	2.0	2.0	2.0	1.0	2.1	7.5	4.0	205		180
73	21	11	AM	3	2	2.0	2.0	2.0	1.0	2.1	7.2	3.8	17?		175
73	21/11/73 ACCLIMATING PLANT A (TSC) TO SSRT OF 7 DAYS AND 5 C, PLANT B NOT														
73	OPERATING IN TSS MODE														
73	22	11	AM	3		2.0	2.0	2.0	1.0		7.5	4.5	180		171
73	23	11	AM	3		2.0	2.0	2.0	1.0		7.6	4.0	128		181
73	24	11	AM	3		2.0	2.0	2.0	1.0						

Note: Return Sludge and Feed Rates given as Igal/min.

MODE OF OPERATION

YEAR	DATE DAY	MON	TIME	OPERATING MODE A	B	FEED RATES A	B	RETURN SLUDGE RATES A	B1	B2	RAW SEWAGE PH	TEMP	SS	HACH NH3N	ALK
73	SSRT PLANT A CALCULATION FROM 24/11/73 TO 29/11/73														
73	25	11	AM	3		2.0	2.0	2.C	1.0						
73	26	11	AM	3		2.0	2.0	2.C	1.0		7.5	4.0	159		175
73	27	11	AM	3		2.0	2.0	2.0	1.0			4.0	121		181
73	28	11	AM	3		2.0	2.0	2.0	1.0		7.4	4.5	139		183
73	29	11	AM	3		2.0	2.0	2.C	1.0		7.6	4.0	197		178
73	30	11	AM	3		2.0	2.0	2.0	1.0		7.6	4.0	159		171
73	30/11/73 TO 23/01/74 ADDITIONAL PRELIMINARY EXPERIMENTAL PERIOD														
74	23/01/74 ACCLIMATING PLANT A (SSC) AND PLANT B (TSS) TO SSRT 4 DAYS AND 5 C														
74	23	01	AM	1	2	2.0	2.0	2.5	2.0	2.5	7.4		100		139
74	24	01	AM	1	2	2.0	2.0	2.5	2.5	2.5	7.5		84		158
74	25	01	AM	1	2	2.0	2.0	2.5	2.5	2.5	7.4	2.5	111	8	185
74	26	01	AM	1	2	2.0	2.0	2.5	2.5	2.5					
74	27	01	AM	1	2	2.0	2.0	2.5	2.5	2.5					
74	28	01	AM	1	2	2.0	2.0	2.5	2.5	2.5	7.4	3.0	103	13	170
74	SSRT PLANT A AND PLANT B CALCULATIONS BASED FROM 29/01/74 ,TO 05/02/74														
74	29/01/74 ACCLIMATION COMPLETE														
74	29	01	AM	1	2	2.0	2.0	2.5	2.5	2.5	7.4	3.0	191		174
74	30	01	AM	1	2	2.0	2.C	2.5	2.5	2.5	7.5		117		180
74	31	01	AM	1	2	2.0	2.0	2.5	2.5	2.5	7.4	2.8	188		165
74	01	02	AM	1	2	2.0	2.0	2.5	2.5	2.5	7.0	3.0	165		146
74	02	02	AM	1	2	2.0	2.0	2.5	2.5	2.5					
74	03	02	AM	1	2	2.0	2.0	2.5	2.5	2.5					
74	04	02	AM	1	2	2.0	2.0	2.5	2.5	2.5	6.3	3.5	120		146
74	05	02	AM	1	2	2.0	2.0	2.5	2.5	2.5	7.5	4.0	126		151
74	06/02/74 ACCLIMATING PLANT A (TSC) AND PLANT B (TSS) TO SSRT 4 DAYS AND 10 C														
74	06	02	AM	3	2	2.0	2.0	2.5	2.5	2.5	7.5	8.0	127		162
74	07	02	AM	3	2	2.0	2.0	2.5	2.5	2.5	7.8	9.8	127		162
74	08	02	AM	3	2	2.0	2.0	2.5	2.5	2.5	7.8	10.0	34		151
74	SSRT PLANT A AND PLANT B CALCULATIONS BASED FROM 09/02/74 ,TO 13/02/74														
74	09	02	PM	3	2	2.0	2.0	2.5	2.5	2.5					151
74	10	02	AM	3	2	2.0	2.0	2.5	2.5	2.5		8.5			
74	11/02/74 ACCLIMATION COMPLETE BUT PLANT B AT SSRT OF 7 DAYS														
74	11	02	AM	3	2	2.0	2.0	2.5	2.5	2.5	7.7	9.3	115		165
74	12	02	AM	3	2	2.0	2.0	2.5	2.5	2.5		8.8	212		162
74	13	02	AM	3	2	2.0	2.0	2.5	2.5	2.5		8.3	607		148
74	14/02/74 ACCLIMATING PLANT A (TSC) AND PLANT B (TSS) TO SSRT 4 DAYS AND 10 C														
74	14	02	AM	3	2	2.0	2.0	2.5	2.5	2.5	7.5				
74	15	02	AM	3	2	2.0	2.0	2.5	2.5	2.5	7.9	8.8			
74	16	02	AM	3	2	2.0	2.0	2.5	2.5	2.5					
74	17	02	AM	3	2	2.0	2.0	2.5	2.5	2.5					
74	SSRT PLANT A AND PLANT B CALCULATIONS BASED FROM 18/02/74 ,TO 21/02/74														
74	18	02	AM	3	2	2.0	2.0	2.5	2.5	2.5	7.5		237		
74	19/02/74 ACCLIMATION COMPLETE														
74	19	02	AM	3	2	2.0	2.0	2.5	2.5	2.5	7.6	9.0	472		169
74	20	02	AM	3	2	2.0	2.0	2.5	2.5	2.5	7.6	10.0	182		
74	21	02	AM	3	2	2.0	2.0	2.5	2.5	2.5	7.6	9.5	518		143
74	22/02/74 ACCLIMATING PLANT A (TSC) AND PLANT B (TSS) TO SSRT 4 DAYS AND 15 C														

MODE OF OPERATION

YEAR	DATE DAY	DATE MON	TIME	OPERATING MODE A	OPERATING MODE B	FEED RATES A	FEED RATES B	RETURN SLUDGE RATES A	RETURN SLUDGE RATES B1	RETURN SLUDGE RATES B2	RAW SEWAGE PH	RAW SEWAGE TEMP	RAW SEWAGE SS	RAW SEWAGE HACH NH3N	RAW SEWAGE ALK
74	22	02	AM	3	2	2.0	2.0	2.5	2.5	2.5	7.5	14.5	457		
74	23	02	AM	3	2	2.0	2.0	2.5	2.5	2.5		13.8			
74	24	02	AM	3	2	2.0	2.0	2.5	2.5	2.5		15.0			
74	25	02	AM	3	2	2.0	2.0	2.5	2.5	2.5		14.8			
74	SSRT PLANT A AND PLANT B CALCULATIONS BASED FROM 26/02/74 ,TO 01/03/74														
74	26/02/74 AMMONIA AND BICARBONATE SPIKE TO TEMPERATURE CONTROLLER START AT														
74	2020 HRS AND STOP 28/02/74 0900 HRS														
74	26	02	AM	3	2	2.0	2.0	2.5	2.5	2.5		14.0			
74	27/02/74 ACCLIMATION COMPLETE														
74	27	02	AM	3	2	2.0	2.0	2.5	2.5	2.5		13.8	280		157
74	28	02	AM	3	2	2.0	2.0	2.5	2.5	2.5		15.0	143		
74	01/03/74 AMMONIA AND BICARBONATE SPIKE TO TEMPERATURE CONTROLLER START AT														
74	0800 HRS AND STOP 02/03/74 0900 HRS														
74	01	03	AM	3	2	2.0	2.0	2.5	2.5	2.5		14.5	284		151
74	02	03	AM	3	2	2.0	2.0	2.5	2.5	2.5		14.0			
74	03	03	AM	3	2	2.0	2.0	2.5	2.5	2.5					
74	04	03	AM	3	2	2.0	2.0	2.5	2.5	2.5	7.8		338		175
74	04/03/74 (0900 HRS) PRELIMINARY TEMPERATURE STEP RESPONSE STUDY,TEMPERATURE														
74	REDUCED FROM 15 C TO 5 C IN TEMPERATURE CONTROLLER														
74	ALL 3 OR 4 HOUR COMPOSITE SAMPLING STARTED AT 0900 HR ON INITIAL SAMPLING														
74	DAY ACCEPTIONS AS NOTED														
74	05	03	AM	3	2	2.0	2.0	2.5	2.5	2.5	7.7	4.3	316		148
74	06	03	AM	3	2	2.0	2.0	2.5	2.5	2.5	7.4	3.5	52		158
74	06/03/74 TEMPERATURE STEP RESPONSE STUDY ENDED PLANT B (TSS)														
74	07	03	AM	3	2	2.0	0.0	2.5	2.5	0.0	7.5	3.0	84		152
74	08/03/74 TEMPERATURE STEP RESPONSE STUDY ENDED PLANT A (SSC)														
74	08	03	AM	3	2	2.0	2.0	2.5	2.5	2.5	7.6	3.5	163		162
74	09	03	AM	3	2	2.0	2.0	2.5	2.5	2.5	7.8				
74	10	03	AM	3	2	2.0	2.0	2.5	2.5	2.5	7.8	3.3			
74	MAR 11 TEMP CHANGE FROM 5 C TO 10 C.LOSS OF SOLIDS FROM BOTH B1 AND B2 EVI														
74	DENT.RAW SEWAGE OVERNIGHT SUSPECT.PUMPED SOLIDS INTO B SYSTEM FROM														
74	A SYSTEM														
74	11	03	AM	3	2	2.0	2.0	2.5	2.5	2.5		3.5	135		157
74	12	03	AM	3	2	2.0	2.0	2.5	2.5	2.5		3.5	38		157
74	13	03	AM	3	2	2.0	2.0	2.5	2.5	2.5		9.0	144		156
74	14	03	AM	3	2	2.0	2.0	2.5	2.5	2.5		9.0			158
74	15	03	AM	3	2	2.0	2.0	2.5	2.5	2.5	7.7	7.8	152		165
74	16	03	AM	3	2	2.0	2.0	2.5	2.5	2.5		8.0			
74	17	03	AM	3	2	2.0	2.0	2.5	2.5	2.5	7.6				
74	18	03	AM	3	2	2.0	2.0	2.5	2.5	2.5	8.2		126		160
74	19	03	AM	3	2	2.0	2.0	2.5	2.5	2.5	7.8	5.0	114		154
74	20	03	AM	3	2	2.0	2.0	2.5	2.5	2.5	7.6	4.8	161		149
74	21	03	AM	3	2	2.0	2.0	2.5	2.5	2.5	7.8	9.3	114	25	150
74	22	03	AM	3	2	2.0	2.0	2.5	2.5	2.5	7.5	11.0	210		137
74	23	03	AM	3	2	2.0	2.0	2.5	2.5	2.5		9.3			
74	24	03	AM	3	2	2.0	2.0	2.5	2.5	2.5	7.7	11.0			
74	25	03	AM	3	2	2.0	2.0	2.5	2.5	2.5	8.2	8.8	258		148
74	25/03/74 ACCLIMATING PLANT A (TSC) AND PLANT B (TSS) TO SSRT 10 DAYS AND 10 C														

MODE OF OPERATION

YEAR	DATE DAY	MON	TIME	OPERATING MODE A	B	FEED RATES A	B	RETURN SLUDGE RATES A	B1	B2	RAW SEWAGE PH	TEMP	SS	HACH NH3N	ALK
74	26	03	AM	3	2	1.25	1.25	1.6	2.5	1.6	7.5	9.0	187		145
74	27	03	AM	3	2	1.25	1.25	1.6	2.5	1.6	7.7	9.3	142		137
74	28	03	AM	3	2	1.25	1.25	1.6	1.6	1.6	7.5	9.8	165		143
74	29/03/74 TEMPERATURE CONTROLLER MALFUNCTION,COOLING TO LOW ,CORRECTED														
74	29	03	AM	3	2	1.25	1.25	1.6	1.6	1.6	8.0	2.0	245		146
74	30	03	AM	3	2	1.25	1.25	1.6	1.6	1.6	7.7				143
74	31	03	AM	3	2	1.25	1.25	1.6	1.6	1.6					
74	01	04	AM	3	2	1.25	1.25	1.6	1.6	1.6	7.6		230		141
74	02	04	AM	3	2	1.25	1.25	1.6	1.6	1.6	7.8		207		141
74	03/04/74 AMMONIA SPIKE TO TEMPERATURE CONTROLLER START AT 0900 HRS														
74	AND STOP 04/04/74 0900 HRS														
74	03	04	AM	3	2	1.25	1.25	1.6	1.6	1.6	7.4	8.5	336		166
74	04	04	AM	3	2	1.25	1.25	1.6	1.6	1.6	7.8	8.0	141		
74	05/04/74 AMMONIA SPIKE TO TEMPERATURE CONTROLLER START AT 0900 HRS														
74	AND STOP 06/04/74 0900 HRS														
74	05	04	AM	3	2	1.25	1.25	1.6	1.6	1.6	7.5	7.5	228		161
74	06/04/74 ACCLIMATING PLANT A (TSC) AND PLANT B (TSS) TO SSRT 10 DAYS AND 15 C														
74	06	04	AM	3	2	1.25	1.25	1.6	1.6	1.6		15.3			
74	07	04	AM	3	2	1.25	1.25	1.6	1.6	1.6	7.6				
74	SSRT PLANT A AND PLANT B CALCULATIONS BASED FROM 08/04/74 ,TO 10/04/74														
74	RETURN SLUDGE PUMP B1 FOUND OFF IN AM ,IT WAS REPAIRED AND IN OPERATION														
74	BY 1000 HRS.														
74	08	04	AM	3	2	1.25	1.25	1.6	1.6	1.6	7.1	13.8	246		
74	09/04/74 ACCLIMATION COMPLETE,AMMONIA SPIKE TO TEMPERATURE CONTROLLER TO														
74	OBSERVE REACTOR RESPONSE AND FOR RATE ANALYSIS ON 10/04/74.														
74	09/04/74 AMMONIA SPIKE TO TEMPERATURE CONTROLLER START AT 0900 HRS														
74	AND STOP 11/04/74 0900 HRS														
74	09	04	AM	3	2	1.25	1.25	1.6	1.6	1.6	7.8	13.5	136		160
74	10	04	AM	3	2	1.25	1.25	1.6	1.6	1.6	7.5	13.7	312		160
74	11/04/74 ACCLIMATING PLANT A (TSC) AND PLANT B (TSS) TO SSRT 10 DAYS AND 5 C														
74	11	04	AM	3	2	1.25	1.25	1.6	1.6	1.6	8.1		158		
74	12	04	AM	3	2	1.25	1.25	1.6	1.6	1.6			123		
74	13	04	AM	3	2	1.25	1.25	1.6	1.6	1.6					
74	14	04	AM	3	2	1.25	1.25	1.6	1.6	1.6					
74	SSRT PLANT A AND PLANT B CALCULATIONS BASED FROM 15/C4/74 ,TO 18/04/74														
74	15	04	AM	3	2	1.25	1.25	1.6	1.6	1.6			125		
74	16/04/74 ACCLIMATION COMPLETE														
74	16	04	AM	3	2	1.25	1.25	1.6	1.6	1.6	7.4	3.5	294		154
74	17	04	AM	3	2	1.25	1.25	1.6	1.6	1.6	7.4	3.0	203		
74	17/04/74 AMMONIA SPIKE TO TEMPERATURE CONTROLLER START AT 0900 HRS														
74	AND STOP 19/04/74 0900 HRS														
74	18	04	AM	3	2	1.25	1.25	1.6	1.6	1.6	7.4	2.3	148		157
74	19/04/74 ACCLIMATING PLANT A (SSC) AND PLANT B (TSS) TO SSRT 10 DAYS AND 10 C														
74	19	04	AM	1	2	1.25	1.25	1.6	1.6	1.6	7.5	9.0	150		
74	20	04	AM	1	2	1.25	1.25	1.6	1.6	1.6	7.5				
74	21	04	AM	1	2	1.25	1.25	1.6	1.6	1.6	7.6				
74	22	04	AM	1	2	1.25	1.25	1.6	1.6	1.6	7.5	9.5	170		
74	23/04/74 AMMONIA SPIKE TO TEMPERATURE CONTROLLER START AT 0900 HRS														

MODE OF OPERATION

YEAR	DAY	MON	TIME	OPERATING MODE A	OPERATING MODE B	FEED RATES A	FEED RATES B	RETURN SLUDGE RATES A	RETURN SLUDGE RATES B1	RETURN SLUDGE RATES B2	RAW SEWAGE PH	RAW SEWAGE TEMP	RAW SEWAGE SS	RAW SEWAGE HACH NH3N	RAW SEWAGE ALK
74	AND STOP 24/04/74 0900 HRS														
74	23	04	AM	1	2	1.25	1.25	1.6	1.6	1.6	8.0	8.0	768		171
74	24	04	AM	1	2	1.25	1.25	1.6	1.6	1.6	7.6		131		
74	25/04/74 AMMONIA SPIKE TO TEMPERATURE CONTROLLER START AT 0900 HRS														
74	AND STOP 26/04/74 0900 HRS														
74	25	04	AM	1	2	1.25	1.25	1.6	1.6	1.6	7.5	8.0	174		204
74	26/04/74 ACCLIMATING PLANT A (SSC) AND PLANT B (TSS) TO SSRT 10 DAYS AND 20 C														
74	26	04	AM	1	2	1.25	1.25	1.6	1.6	1.6	7.4	13.5	240		
74	27	04	AM	1	2	1.25	1.25	1.6	1.6	1.6					
74	28	04	AM	1	2	1.25	1.25	1.6	1.6	1.6					
74	SSRT PLANT A AND PLANT B CALCULATIONS BASED FROM 29/04/74 ,TO 01/05/74														
74	29	04	AM	1	2	1.25	1.25	1.6	1.6	1.6	7.5	20.0	139		
74	30/04/74 ACCLIMATION COMPLETE ,AMMONIA SPIKE TO TEMPERATURE CONTROLLER TO														
74	OBSERVE REACTOR RESPONSE AND FOR RATE ANALYSIS ON 01/05/74														
74	30	04	AM	1	2	1.25	1.25	1.6	1.6	1.6	7.3	20.5	192		213
74	01	05	AM	1	2	1.25	1.25	1.6	1.6	1.6	7.4	21.0	196		209
74	02/05/74 ACCLIMATING PLANT A (SSC) AND PLANT B (TSS) TO SSRT 7 DAYS AND 15 C														
74	02	05	AM	1	2	2.0	2.0	2.5	2.3	2.5	7.4		143		
74	03	05	AM	1	2	2.0	2.0	2.5	2.3	2.5	7.2		141		
74	04	05	AM	1	2	2.0	2.0	2.5	2.3	2.5					
74	05	05	AM	1	2	2.0	2.0	2.5	2.3	2.5					
74	06	05	AM	1	2	2.0	2.0	2.5	2.3	2.5	7.4	13.5	166		
74	07	05	AM	1	2	2.0	2.0	2.5	2.3	2.5	7.6	14.0	122		
74	08 05 RETURN SLUDGE PUMP B1 FAILED,ALL SOLIDS IN CLARIFIER														
74	08	05	AM	1	2	2.0	2.0	2.5	2.3	2.5	7.4	14.0	170		210
74	09	05	AM	1	2	2.0	2.0	2.5	2.3	2.5	7.4		176		176
74	10	05	AM	1	2	2.0	2.0	2.5	2.3	2.5	7.6	10.0	134		202
74	11	05	AM	1	2	2.0	2.0	2.5	2.3	2.5	7.5				
74	12	05	AM	1	2	2.0	2.0	2.5	2.3	2.5					
74	13	05	AM	1	2	2.0	2.0	2.5	2.3	2.5	7.5	14.3	104		212
74	14/05/74 AMMONIA SPIKE TO TEMPERATURE CONTROLLER START AT 0300 HRS														
74	AND STOP 15/05/74 0900 HRS														
74	14	05	AM	1	2	2.0	2.0	2.5	2.3	2.5	8.8	14.0	176		227
74	15	05	AM	1	2	2.0	2.0	2.5	2.3	2.5	9.9	14.5	131		208
74	16/05/74 AMMONIA SPIKE TO TEMPERATURE CONTROLLER START AT 0900 HRS														
74	AND STOP 17/05/74 0900 HRS														
74	16	05	AM	1	2	2.0	2.0	2.5	2.3	2.5	7.6	14.3	256		200
74	17/05/74 ACCLIMATING PLANT A (TSC) AND PLANT B (TSS) TO SSRT 7 DAYS AND 5 C														
74	17	05	AM	3	2	2.0	2.0	2.5	2.5	2.5	7.5	4.5	59		202
74	18	05	AM	3	2	2.0	2.0	2.5	2.5	2.5					
74	SSRT PLANT A AND PLANT B CALCULATIONS BASED FROM 19/05/74 ,TO 23/05/74														
74	19	05	AM	3	2	2.0	2.0	2.5	2.5	2.5					
74	20	05	AM	3	2	2.0	2.0	2.5	2.5	2.5			95		216
74	21/05/74 ACCLIMATION COMPLETE														
74	21	05	AM	3	2	2.0	2.0	2.5	2.5	2.5		4.0	118		213
74	22	05	AM	3	2	2.0	2.0	2.5	2.5	2.5		4.3	83		214
74	23	05	AM	3	2	2.0	2.0	2.5	2.5	2.5		3.5	137		214
74	24/05/74 ACCLIMATING PLANT A (SSC) AND PLANT B (TSS) TO SSRT 7 DAYS AND 5 C														

MODE OF OPERATION

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                                                                                     ---RAW SEWAGE------
          DATE       OPERATING                                                                 HACH
                          MODE   FEED RATES     RETURN SLUDGE RATES                           NH3N
YEAR  DAY MON TIME A  B      A    B                A        B1  B2                PH TEMP SS       ALK
 74    24 05 MLSS ENTERING FROM SKYWAY PLANT WILL EFFECT RATE DAY 23 05
 74    24 05  AM   1  2     2.0 2.0        2.5          2.5 2.5                      5.0 876      221
 74    25 05  AM   1  2     2.0 2.0        2.5          2.5 2.5
 74          MAY 26 MIXED LIQUOR SOLIDS PUMPED INTO PLANT IN RAW SEWAGE FOR UNKNOWN
 74          LENGTH OF TIME
 74    26 05  AM   1  2     2.0 2.0        2.5          2.5 2.5
 74    27 05  AM   1  2     2.0 2.0        2.5          2.5 2.5                      5.0
 74    27 05 MLSS MUST HAVE COME IN RAW SEWAGE ON WKEND ALL CLARIFIERS OVERFLOWING
 74    27 05 WITH SOLIDS
 74          MAY 28 PLANT DOWN 8 HRS HEAVY SOLIDS IN RAW SEWAGE AGAIN
 74    NO SAMPLING 28 MAY DUE TO MLSS COMING IN DURING WEEKEND
 74    28 05  AM   1  2     2.0 2.0        2.5          2.5 2.5                      4.8
 74    29 05  AM   1  2     2.0 2.0        2.5          2.5 2.5                      4.0
 74    30/05/74 HEAVY SOLIDS COMING IN RAW SEWAGE INTERMITTENTLY
 74    30 05  AM   1  2     2.0 2.0        2.5          2.5 2.5                      4.0
 74          MAY 31 PLANT DOWN APPROX 1 HR SOLIDS RESULTS TAKEN AFTER SYSTEMS WERE DOWN
 74          RESULTING IN HIGHER THAN NORMAL VALUES.
 74    31 05  AM   1  2     2.0 2.0        2.5          2.5 2.5                      3.8
 74    01 06  AM   1  2     2.0 2.0        2.5          2.5 2.5
 74    02 06  AM   1  2     2.0 2.0        2.5          2.5 2.5
 74    03/06/74 ACCLIMATION COMPLETE
 74    SSRT   PLANT A AND PLANT B  CALCULATIONS BASED FROM 03/06/74 ,TO 06/06/74
 74    03 06  AM   1  2     1.6 1.6        2.0          2.0 2.0                      4.8
 74    04 06  AM   1  2     1.6 1.6        2.0          2.0 2.0              7.5     4.8          215
 74    05 06  AM   1  2     1.6 1.6        2.0          2.0 2.0                      6.0
 74    06 06  AM   1  2     1.6 1.6        2.0          2.0 2.0              7.8     5.5 476      178
 74    07/06/74 ACCLIMATING PLANT A (SSC) AND PLANT B (TSS) TO SSRT 7 DAYS AND 10 C
 74    07 06  AM   1  2     1.6 1.6        2.0          2.0 2.0                      6.0
 74    08 06  AM   1  2     1.6 1.6        2.0          2.0 2.0                      8.0
 74    09 06  AM   1  2     1.6 1.6        2.0          2.0 2.0
 74    SSRT   PLANT A AND PLANT B  CALCULATIONS BASED FROM 10/06/74 ,TO 13/06/74
 74    10 06  AM   1  2     1.6 1.6        2.0          2.0 2.0
 74    11/06/74 NO RAW SEWAGE DURING PART OF THE NIGHT,TEMPERATURE CONTROLLER DRY
 74          AT 0300 HRS.
 74    11 06  AM   1  2     1.6 1.6        2.0          2.0 2.0
 74    12/06/74 AMMONIA SPIKE TO TEMPERATURE CONTROLLER START   AT 1700 HRS
 74          AND STOP   14/06/74   0900 HRS
 74    12 06  AM   1  2     1.6 1.6        2.0          2.0 2.0
 74    13/06/74 ACCLIMATION COMPLETE
 74    13 06  AM   1  2     1.6 1.6        2.0          2.0 2.0                          210       99
 74    14/06/74 ACCLIMATING PLANT A (TSC) AND PLANT B (TSS) TO SSRT 7 DAYS AND 10 C
 74    14 06  AM   3  2     1.6 1.6              2.0    2.0 2.0              7.2                   9.
 74    15 06  AM   3  2     1.6 1.6              2.0    2.0 2.0
 74    16 06  AM   3  2     1.6 1.6              2.0    2.0 2.0
 74    17/06/74 ACCLIMATION COMPLETE
 74    SSRT   PLANT A AND PLANT B  CALCULATIONS BASED FROM 17/06/74 ,TO 20/06/74
 74    17 06  AM   3  2     1.6 1.6              2.0    2.0 2.0
 74    19/06/74 AMMONIA SPIKE TO TEMPERATURE CONTROLLER START   AT 0900 HRS
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MODE OF OPERATION

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                                                                                ---RAW SEWAGE------
      DATE        OPERATING                                                            HACH
                     MODE   FEED RATES      RETURN SLUDGE RATES                        NH3N
YEAR  DAY MON TIME A  B       A   B             A        B1  B2                 PH TEMP SS      ALK
74          AND STOP   19/06/74   0900 HRS
74    18 06  AM    3  2      1.6 1.6           2.0      2.0 2.0                          254
74    19/06/74 AMMONIA SPIKE TO TEMPERATURE CONTROLLER START    AT 1700 HRS
74          AND STOP   21/06/74   0900 HRS
74    19 06  AM    3  2      1.6 1.6           2.0      2.0 2.0
74    NO MLSS TKN SAMPLES TAKEN DUE TO OPERATOR ERROR
74    20 06  AM    3  2      1.6 1.6           2.0      2.0 2.0      8.1                        101
74    21 06 PILOT PLANT SHUT DOWN FOR 6-1/2 HRS MLSS COMING IN RAW SEWAGE AGAIN
74    21/06/74 ACCLIMATING PLANT A (TSC) AND PLANT B (TSS) TO SSRT 7 DAYS AND 15 C
74    21 06  AM    3  2      1.6 1.6           2.0      2.0 2.0      8.1
74    22 06  AM    3  2      1.6 1.6           2.0      2.0 2.0      8.1
74    23 06  AM    3  2      1.6 1.6           2.0      2.0 2.5      8.1
74    SSRT   PLANT A AND PLANT B  CALCULATIONS BASED FROM 24/06/74 ,TO 28/06/74
74    24 06  AM    3  2      1.6 1.6           2.0      2.0 2.0      7.3                         81
74    25/06/74 MLSS PLUS DILUTION WATER IN RAW SEWAGE
74    25/06/74 PLANT BACK TO NORMAL 1000 HRS.DILUTION WATER OFF
74    25/06/74 AMMONIA SPIKE TO TEMPERATURE CONTROLLER START    AT 1700 HRS
74          AND STOP   26/06/74   0900 HRS
74    25 06  AM    3  2      1.6 1.6           2.0      2.0 2.0
74    26/06/74 ACCLIMATION COMPLETE
74    26 06  AM    3  2      1.6 1.6           2.0      2.0 2.0
74    27/06/74 AMMONIA SPIKE TO TEMPERATURE CONTROLLER START    AT 1700 HRS
74          AND STOP   29/06/74   0900 HRS
74    27 06  AM    3  2      1.6 1.6           2.0      2.0 2.0      7.8         172
74    28 06  AM    1  2      1.6 1.6         2.0        2.0 2.0                  180        108
74    29/06/74 ACCLIMATING PLANT A (SSC) AND PLANT B (TSS) TO SSRT 7 DAYS AND 15 C
74    29 06  AM    1  2      1.6 1.6         2.0        2.0 2.0
74    30 06  AM    1  2      1.6 1.6         2.0        2.0 2.0
74    SSRT   PLANT A AND PLANT B  CALCULATIONS BASED FROM 01/07/74 ,TO 05/07/74
74    01/07/74 AMMONIA SPIKE TO TEMPERATURE CONTROLLER START    AT 2200 HRS
74          AND STOP   03/07/74   0900 HRS
74    01 07  AM    1  2      1.6 1.6         2.0        2.0 2.0
74    02/07/74 ACCLIMATION COMPLETE
74    02 07  AM    1  2      1.6 1.6         2.0        2.0 2.0      7.3         280        101
74    03 07  AM    1  2      1.6 1.6         2.0        2.0 2.0
74    04/07/74 AMMONIA SPIKE TO TEMPERATURE CONTROLLER START    AT 1700 HRS
74          AND STOP   06/07/74   0900 HRS
74    04 07  AM    1  2      1.6 1.6         2.0        2.0 2.0
74    05 07  AM    1  2      1.6 1.6         2.0        2.0 2.0      6.0         268        110
74    06/07/74 ACCLIMATING PLANT A (TSC) AND PLANT B (TSS) TO SSRT 7 DAYS AND  5 C
74    06 07  AM    3  2      1.6 1.6           2.0      2.0 2.0
74    07 07  AM    3  2      1.6 1.6           2.0      2.0 2.0
74    SSRT   PLANT A AND PLANT B  CALCULATIONS BASED FROM 08/07/74 ,TO 12/07/74
74    08 07  AM    3  2      1.6 1.6           2.0      2.0 2.0
74    09 07  AM    3  2      1.6 1.6           2.0      2.0 2.0
74    10/07/74 ACCLIMATION COMPLETE
74    10 07  AM    3  2      1.6 1.6           2.0      2.0 2.0      7.3         192        104
74    11 07  AM    3  2      1.6 1.6           2.0      2.0 2.0
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MODE OF OPERATION

YEAR	DATE DAY	MON	TIME	OPERATING MODE A	B	FEED RATES A	B	RETURN SLUDGE RATES A	B1	B2	RAW SEWAGE PH	TEMP	HACH NH3N SS	ALK
74	12	07	AM	3	2	1.6	1.6	2.0	2.0	2.0	7.2		132	107
74	13/07/74 ACCLIMATING PLANT A (SSC) AND PLANT B (TSS) TO SSRT 4 DAYS AND 15 C													
74	13	07	AM	1	2	2.0	2.0	2.0	2.0	2.0				
74	14	07	AM	1	2	2.0	2.0	2.0	2.0	2.0				
74	SSRT PLANT A AND PLANT B CALCULATIONS BASED FROM 15/07/74 ,TO 18/07/74													
74	15/07/74 AMMONIA SPIKE TO TEMPERATURE CONTROLLER START AT 1700 HRS													
74	AND STOP 17/07/74 0900 HRS													
74	15	07	AM	1	2	2.0	2.0	2.0	2.0	2.0				
74	16/07/74 ACCLIMATION COMPLETE													
74	16	07	AM	1	2	2.0	2.0	2.0	2.0	2.0	7.5		240	113
74	17/07/74 AMMONIA SPIKE TO TEMPERATURE CONTROLLER START AT 1700 HRS													
74	AND STOP 19/07/74 0900 HRS													
74	17	07	AM	1	2	2.0	2.0	2.0	2.0	2.0				
74	18	07	AM	1	2	2.0	2.0	2.0	2.0	2.0	7.3		652	108
74	19/07/74 ACCLIMATING PLANT A (TSC) AND PLANT B (TSS) TO SSRT 4 DAYS AND 15 C													
74	SSRT PLANT A AND PLANT B CALCULATIONS BASED FROM 19/07/74 ,TO 22/07/74													
74	19	07	AM	3	2	2.0	2.0	2.0	2.0	2.0				
74	20	07	AM	3	2	2.0	2.0	2.0	2.0	2.0				
74	21/07/74 AMMONIA SPIKE TO TEMPERATURE CONTROLLER START AT 1700 HRS													
74	AND STOP 23/07/74 0900 HRS													
74	21	07	AM	3	2	2.0	2.0	2.0	2.0	2.0				
74	22/07/74 ACCLIMATION COMPLETE													
74	22	07	AM	3	2	2.0	2.0	2.0	2.0	2.0	7.3		248	104
74	23/07/74 ACCLIMATING PLANT A (TSC) AND PLANT B (TSS) TO SSRT 7 DAYS AND 20 C													
74	23	07	AM	3	2	1.6	1.6	2.0	2.0	2.0				
74	24	07	AM	3	2	1.6	1.6	2.0	2.0	2.0				
74	SSRT PLANT A AND PLANT B CALCULATIONS BASED FROM 25/07/74 ,TO 08/08/74													
74	25	07	AM	3	2	1.6	1.6	2.0	2.0	2.0			244	
74	26	07	AM	3	2	1.6	1.6	2.0	2.0	2.0			238	
74	27	07	AM	3	2	1.6	1.6	2.0	2.0	2.0				
74	28	07	AM	3	2	1.6	1.6	2.0	2.0	2.0				
74	29/07/74 AMMONIA SPIKE TO TEMPERATURE CONTROLLER START AT 1700 HRS													
74	AND STOP 31/07/74 0900 HRS													
74	29	07	AM	3	2	1.6	1.6	2.0	2.0	2.0	7.6		272	
74	30/07/74 ACCLIMATION COMPLETE													
74	30	07	AM	3	2	1.6	1.6	2.0	2.0	2.0	7.4		238	111
74	31	07	AM	3	2	1.6	1.6	2.0	2.0	2.0	7.3		-999	
74	01 08 MIXED LIQUOR IN RAW SEWAGE OVERNIGHT													
74	01 08 OPERATOR ERROR,ESTIMATE EFFLUENT SOLIDS A2=25,B1=30,B2=23 MG/L													
74	01	08	AM	3	2	1.6	1.6	2.0	2.0	2.0	7.2			
74	02	08	AM	3	2	1.6	1.6	2.0	2.0	2.0	7.5		244	
74	03	08	AM	3	2	1.6	1.6	2.0	2.0	2.0				
74	SSRT PLANT A AND PLANT B CALCULATIONS BASED FROM 04/08/74 ,TO 08/08/74													
74	04 08 OPERATOR ERROR,ESTIMATE MLSS A1=6800,A2=7000,B1=4000,B2=4000 MG/L													
74	04	08	AM	3	2	1.6	1.6	2.0	2.0	2.0				
74	05 08 TO 09 08 CLARIFIER BLANKET PLANT A, VERY HIGH DURING WEEK													
74	05/08/74 AMMONIA SPIKE TO TEMPERATURE CONTROLLER START AT 1700 HRS													
74	AND STOP 07/08/74 0900 HRS													

MODE OF OPERATION

YEAR	DAY	MON	TIME	OPERATING MODE A	OPERATING MODE B	FEED RATES A	FEED RATES B	RETURN SLUDGE RATES A	RETURN SLUDGE RATES B1	RETURN SLUDGE RATES B2	RAW SEWAGE PH	TEMP	SS	HACH NH3N	ALK
74	05	08	AM	3	2	1.6	1.6	2.0	2.0	2.0			224		
74	06	08	AM	3	2	1.6	1.6	2.0	2.0	2.0	7.3		532		
74	07/08/74 AMMONIA SPIKE TO TEMPERATURE CONTROLLER START AT 1700 HRS														
74	AND STOP 09/08/74 0900 HRS														
74	07	08	AM	3	2	1.6	1.6	2.0	2.0	2.0	7.1		756		
74	08 08 HEAVY SOLIDS IN RAW SEWAGE														
74	08 08 ESTIMATE EFFLUENT SOLIDS B2= 3)														
74	08	08	AM	3	2	1.6	1.6	2.0	2.0	2.0	7.8		+999		125
74	09/08/74 ACCLIMATING PLANT A (SSC) AND PLANT B (TSS) TO SSRT 7 DAYS AND 20 C														
74	09 08 PLANT DOWN APPROX 3 HRS, MLSS IN RAW SEWAGE														
74	09	08	AM	1	2	1.6	1.6	2.0	2.0	2.0	7.7				
74	10 08 HEAVY SOLIDS IN RAW SEWAGE, DILUTION WATER														
74	10	08	AM	1	2	1.6	1.6	2.0	2.0	2.0					
74	11 08 HEAVY SOLIDS IN RAW SEWAGE, DILUTION WATER														
74	11	08	AM	1	2	1.6	1.6	2.0	2.0	2.0					
74	12 08 DILUTION WATER OFF														
74	SSRT PLANT A AND PLANT B CALCULATIONS BASED FROM 12/08/74 ,TO 15/08/74														
74	12/08/74 AMMONIA SPIKE TO TEMPERATURE CONTROLLER START AT 1700 HRS														
74	AND STOP 14/08/74 0900 HRS														
74	12	08	AM	1	2	1.6	1.6	2.0	2.0	2.0	7.3		488		
74	13/08/74 ACCLIMATION COMPLETE														
74	13/08/74 RETURN SLUDGE PUMP A FOUND OFF IN AM OF 14/8 DOWN TILL 1000														
74	13	08	AM	1	2	1.6	1.6	2.0	2.0	2.0	7.1		176		96
74	14/08/74 RETURN SLUDGE PUMP A BROKE DOWN OVERNIGHT, OFF APPROXIMATELY 3 HRS.														
74	14/08/74 AMMONIA SPIKE TO TEMPERATURE CONTROLLER START AT 1700 HRS														
74	AND STOP 16/08/74 0900 HRS														
74	14	08	AM	1	2	1.6	1.6	2.0	2.0	2.0	6.6		148		
74	15	08	AM	1	2	1.6	1.6	2.0	2.0	2.0	6.2		184		94
74	16/08/74 ACCLIMATING PLANT A (SSC) AND PLANT B (TSS) TO SSRT 7 DAYS AND 10 C														
74	16	08	AM	1	2	1.6	1.6	2.0	2.0	2.0	6.9				
74	17	08	AM	1	2	1.6	1.6	2.0	2.0	2.0					
74	18	08	AM	1	2	1.6	1.6	2.0	2.0	2.0					
74	SSRT PLANT A AND PLANT B CALCULATIONS BASED FROM 19/08/74 ,TO 22/08/74														
74	19/08/74 AMMONIA SPIKE TO TEMPERATURE CONTROLLER START AT 1700 HRS														
74	AND STOP 21/08/74 0900 HRS														
74	19	08	AM	1	2	1.6	1.6	2.0	2.0	2.0	7.6		204		
74	20/08/74 ACCLIMATION COMPLETE														
74	20	08	AM	1	2	1.6	1.6	2.0	2.0	2.0	7.2		192		
74	21	08	AM	1	2	1.6	1.6	2.0	2.0	2.0	7.4		304		
74	22	08	AM	1	2	1.6	1.6	2.0	2.0	2.0	7.5		264		104
74	23/08/74 ACCLIMATING PLANT A (SSC) AND PLANT B (TSS) TO SSRT 7 DAYS AND 5 C														
74	23	08	AM	1	2	0.5	1.6	1.5	2.0	2.0	7.4				
74	24/08/74 MLSS IN RAW SEWAGE, MOST OF DAY														
74	24	08	AM	1	2	0.5	1.6	1.5	2.0	2.0		3.0			
74	25	08	AM	1	2	0.5	1.6	1.5	2.0	2.0		3.5			
74	26	08	AM	1	2	0.5	1.6	1.5	2.0	2.0		2.5			
74	27	08	AM	1	2	0.5	1.6	1.5	2.0	2.0	7.4	4.5	444		
74	SSRT PLANT A AND PLANT B CALCULATIONS BASED FROM 28/08/74 ,TO 29/08/74														

MODE OF OPERATION

YEAR	DATE DAY	MON	TIME	OPERATING MODE A	B	FEED RATES A	B	RETURN SLUDGE RATES A	B1	B2	RAW SEWAGE PH	TEMP	SS	HACH NH3N ALK
74	28/08/74 AMMONIA SPIKE TO TEMPERATURE CONTROLLER START AT 1700 HRS													
74	AND STOP 30/08/74 0900 HRS													
74	28/08/74 ACCLIMATION COMPLETE PLANT B ONLY													
74	28	08	AM	1	2	0.5	1.6	1.5	2.0	2.0	6.7	5.0	424	89
74	29	08	AM	1	2	0.5	1.6	1.5	2.0	2.0	6.8		.720	94
74	30	08	AM	1	2	1.6	1.6	2.0	2.0	2.0	7.1	5.5		
74	30/08/74 ACCLIMATING PLANT A (SSC) AND PLANT B (TSS) TO SSRT 7 DAYS AND 25 C													
74	31	08	AM	1	2	1.6	1.6	2.0	2.0	2.0				
74	01	09	AM	1	2	1.6	1.6	2.0	2.0	2.0				
74	02	09	AM	1	2	1.6	1.6	2.0	2.0	2.0			33	
74	03	09	AM	1	2	1.6	1.6	2.0	2.0	2.0	7.0		212	
74	04	09	AM	1	2	1.6	1.6	2.3	2.0	2.0	7.1		308	
74	SSRT CALCULATIONS PLANT A AND PLANT B BASED FROM 05/09/74 TO 10/09/74													
74	05/09/74 AMMONIA AND BICARBONATE SPIKE TO TEMPERATURE CONTROLLER START AT													
74	1700 HRS AND STOP 07/09/74 0900 HRS													
74	05	09	AM	1	2	1.6	1.6	2.3	2.0	2.0			276	
74	06/09/74 ACCLIMATION COMPLETE													
74	06	09	AM	1	2	1.6	1.6	2.3	2.0	2.0	7.4		430	129
74	07	09	AM	1	2	1.6	1.6	2.3	2.0	2.0				
74	08	09	AM	1	2	1.6	1.6	2.3	2.0	2.0				
74	09/09/74 AMMONIA AND BICARBONATE SPIKE TO TEMPERATURE CONTROLLER START AT													
74	1700 HRS AND STOP 11/09/74 0900 HRS													
74	09	09	AM	1	2	1.6	1.6	2.3	2.0	2.0	8.5		296	
74	10	09	AM	1	2	1.6	1.6	2.3	2.0	2.0	7.4		472	111
74	11	09	ESTIMATE EFFLUENT SOLIDS B1=19.											
74	11	09	AM	1	2	1.6	1.6	2.3	2.0	2.0	7.1		600	
74	12	09	AM	1	2	1.6	1.6	2.3	2.0	2.0	7.2		384	111
74	13/09/74 ACCLIMATING PLANT A (SSC) AND PLANT B (TSS) TO SSRT 4 DAYS AND 20 C													
74	13	09	AM	1	2	2.0	2.0	2.0	2.5	2.4	7.3			
74	14	09	AM	1	2	2.0	2.0	2.0	2.5	2.4				
74	15	[illegible]	HEAVY SOLIDS IN RAW SEWAGE											
74	15	09	AM	1	2	2.0	2.0	2.0	2.5	2.4				
74	15/09/74 PLANT A CHANGED FROM SSC SYSTEM TO TSC SYSTEM													
74	SSRT PLANT A AND PLANT B CALCULATIONS BASED FROM 16/09/74 ,TO 19/09/74													
74	15/09/74 AMMONIA AND BICARBONATE SPIKE TO TEMPERATURE CONTROLLER START AT													
74	1700 HRS AND STOP 18/09/74 0900 HRS													
74	16	09	AM	3	2	2.0	2.0	2.0 2.0	2.5	2.4			112	
74	17/09/74 ACCLIMATION COMPLETE													
74	17	09	AM	3	2	2.0	2.0	2.0	2.5	2.4	7.5		284	116
74	18/09/74 AMMONIA AND BICARBONATE SPIKE TO TEMPERATURE CONTROLLER START AT													
74	1700 HRS AND STOP 20/09/74 0900 HRS													
74	18	09	AM	3	2	2.0	2.0	2.0	2.5	2.4			276	
74	19	09	AM	3	2	2.0	2.0	2.0	2.5	2.4	7.2		352	111
74	20	09	AM	3	2	2.0	2.0	2.0	2.5	2.4	7.3			
74	21	09	AM	3	2	2.0	2.0	2.0	2.5	2.4	7.2			
74	22	09	AM	3	2	2.0	2.0	2.0	2.5	2.4				
74	SSRT PLANT A AND PLANT B CALCULATIONS BASED FROM 23/09/74 ,TO 27/09/74													
74	23	09	AM	3	2	2.0	2.0	2.0	2.5	2.4			384	

MODE OF OPERATION

YEAR	DAY	MON	TIME	OPERATING MODE A	OPERATING MODE B	FEED RATES A	FEED RATES B	RETURN SLUDGE RATES A	RETURN SLUDGE RATES B1	RETURN SLUDGE RATES B2	RAW SEWAGE PH	RAW SEWAGE TEMP	RAW SEWAGE SS	RAW SEWAGE HACH NH3N ALK
74	24/09/74 FEED PUMP B OFF APPROXIMATELY 5 HRS DUE TO MECHANICAL BREAKDOWN													
74	24 09 FEED PUMP B BROKE DOWN,OFF APPROX 5 HRS													
74	24/09/74 AMMONIA AND BICARBONATE SPIKE TO TEMPERATURE CONTROLLER START AT													
74	1700 HRS AND STOP 26/09/74 0900 HRS													
74	24	09	AM	3	2	2.0	2.0	2.0	2.5	2.4	7.3		660	
74	25	09	AM	3	2	2.0	2.0	2.0	2.5	2.4	7.7		365	138
74	26/09/74 AMMONIA AND BICARBONATE SPIKE TO TEMPERATURE CONTROLLER START AT													
74	1700 HRS AND STOP 28/09/74 0900 HRS													
74	26	09	AM	3	2	2.0	2.0	2.0	2.5	2.4	7.8		456	
74	27	09	AM	3	2	2.0	2.0	2.0	2.5	2.4	7.8		456	129
74	28/09/74 ACCLIMATING PLANT B (TSS) TO SSRT OF 7 DAYS AND 5 C ,PLANT A (TSC)													
74	NOT OPERATING FOR RATE ANALYSIS UNTIL 11/10/74.													
74	28	09	AM	3	2	1.6	1.6	2.0	2.0	2.0				
74	29	09	AM	3	2	1.6	1.6	2.0	2.0	2.0				
74	30	09	AM	3	2	1.6	1.6	2.0	2.0	2.0				
74	SSRT PLANT B CALCULATIONS BASED FROM 01/10/74 TO 03/10/74													
74	01	10	AM	3	2	1.6	1.6	2.0	2.0	2.0				
74	02	10	AM	3	2	1.6	1.6	2.0	2.0	2.0				
74	03/10/74 ACCLIMATION COMPLETE													
74	03	10	AM	3	2	1.6	1.6	2.0	2.0	2.0				
74	04	10	AM	3	2	1.6	1.6	2.0	2.0	2.0				
74	05/10/74 ACCLIMATING PLANT B (TSS) TO SSRT OF 4 DAYS AND 5 C AT HYDRAULIC													
74	DETENSION TIME NORMALLY USED FOR 7 DAY SRT													
74	05	10	AM	3	2	1.6	1.6	2.0	2.0	2.0				
74	06	10	AM	3	2	1.6	1.6	2.0	2.0	2.0				
74	SSRT PLANT B CALCULATIONS BASED FROM 07/10/74 TO 10/10/74													
74	07	10	AM	3	2	1.6	1.6	2.0	2.0	2.0				
74	08	10	AM	3	2	1.6	1.6	2.0	2.0	2.0				
74	09	10	AM	3	2	1.6	1.6	2.0	2.0	2.0				
74	10	10	AM	3	2	1.6	1.6	2.0	2.0	2.0	7.4		808	107
74	10	10	AM	3	2	1.6	1.6	0.5	2.0	2.0	7.4		808	107
74	11/10/74 ACCLIMATING PLANT A (TSC) AND PLANT B (TSS) TO SSRT 4 DAYS AND 20 C													
74	11	10	AM	3	2	2.0	2.0	2.5	2.4	2.0	7.0			
74	12	10	AM	3	2	2.0	2.0	2.0	2.0	2.0				
74	13	10	AM	3	2	2.0	2.0	2.0	2.0	2.0				
74	SSRT PLANT A AND PLANT B CALCULATIONS BASED FROM 14/10/74 ,TO 18/10/74													
74	14	10	AM	3	2	2.0	2.0	2.0	2.0	2.0			324	
74	15	10	AM	3	2	2.0	2.0	2.0	2.0	2.0	7.3		616	
74	16/10/74 GRIT REMOVAL FROM RAW SEWAGE IMPROVED BY INSTALLATION OF SMALL OVER-													
74	FLOW BOX.(DETENSION TIME APPROXIMATELY 15 MINUTES) AHEAD OF TEMPERATURE													
74	CONTROLLER													
74	16	10	AM	3	2	2.0	2.0	2.0	2.0	2.0	8.0		344	
74	17/10/74 AMMONIA AND BICARBONATE SPIKE TO TEMPERATURE CONTROLLER START AT													
74	1700 HRS AND STOP 19/10/74 0900 HRS													
74	17	10	AM	3	2	2.0	2.0	2.0	2.0	2.0	7.4		280	280
74	18/10/74 ACCLIMATION COMPLETE													
74	18	10	AM	3	2	2.0	2.0	2.0	2.0	2.0	7.4		758	153
74	19/10/74 ACCLIMATING PLANT A (TSC) AND PLANT B (TSS) TO SSRT 4 DAYS AND 25 C													

MODE OF OPERATION

YEAR	DATE DAY	MON	TIME	OPERATING MODE A	B	FEED RATES A	B	RETURN SLUDGE RATES A	B1	B2	---RAW SEWAGE------ PH	TEMP	SS	HACH NH3N	ALK
74	19	10	AM	3	2	2.0	2.0	2.0	2.0	2.0					
74	20	10	AM	3	2	2.0	2.0	2.0	2.0	2.0					
74	21 10 MLSS COMING IN RAW SEWAGE OVERNIGHT,														
74	21	10	AM	3	2	2.0	2.0	2.0	2.0	2.0					
74	SSRT PLANT A AND PLANT B CALCULATIONS BASED FROM 22/10/74 TO 28/10/74.														
74	22	10	AM	3	2	2.0	2.0	2.0	2.0	2.0	7.4				
74	23	10	AM	3	2	2.0	2.0	2.0	2.0	2.0	7.2		332		
74	24/10/74 AMMONIA AND BICARBONATE SPIKE TO TEMPERATURE CONTROLLER START AT														
74	1700 HRS AND STOP 26/10/74 0900 HRS														
74	24	10	AM	3	2	2.0	2.0	2.0	2.0	2.0	7.9		672		
74	25/10/74 ACCLIMATION COMPLETE														
74	25	10	AM	3	2	2.0	2.0	2.0	2.0	2.0	7.7		232		193
74	26	10	AM	3	2	2.0	2.0	2.0	2.0	2.0	7.5				
74	26/10/74 PLANT A CHANGED FROM TSC SYSTEM TO SSC SYSTEM														
74	27/10/74 AMMONIA AND BICARBONATE SPIKE TO TEMPERATURE CONTROLLER START AT														
74	1200 HRS AND STOP 29/10/74 0900 HRS														
74	27	10	AM	1	2	2.0	2.0	2.0	2.0	2.0					
74	28	10	AM	1	2	2.0	2.0	2.0	2.0	2.0	7.8		180		147
74	29/10/74 ACCLIMATING PLANT A (SSC) AND PLANT B (TSS) TO SSRT 7 DAYS AND 25 C														
74	29	10	AM	1	2	1.6	1.6	2.0	2.0	2.0	8.6				
74	30	10	AM	1	2	1.6	1.6	2.0	2.0	2.0					
74	SSRT PLANT A AND PLANT B CALCULATIONS BASED FROM 31/10/74 ,TO 06/11/74														
74	31	10	AM	1	2	1.6	1.6	2.0	2.0	2.0	7.1		384		
74	01	11	AM	1	2	1.6	1.6	2.0	2.0	2.0			456		
74	02	11	AM	1	2	1.6	1.6	2.0	2.0	2.0					
74	03/11/74 ADDED APPROXIMATELY 10 TO 30 IGAL MLSS FROM B1 TO B2														
74	03/11/74 AMMONIA AND BICARBONATE SPIKE TO TEMPERATURE CONTROLLER START AT														
74	2200 HRS AND STOP 05/11/74 0900 HRS														
74	03	11	AM	1	2	1.6	1.6	2.0	2.0	2.0					
74	04/11/74 ACCLIMATION COMPLETE														
74	04	11	AM	1	2	1.6	1.6	2.0	2.0	2.0	7.7		272		[illegible]
74	05/11/74 PLANT A CHANGED FROM SSC SYSTEM TO TSC SYSTEM														
74	05/11/74 AMMONIA AND BICARBONATE SPIKE TO TEMPERATURE CONTROLLER START AT														
74	2200 HRS AND STOP 07/11/74 0900 HRS														
74	05	11	AM	3	2	1.6	1.6	2.0	2.0	2.0	7.3				
74	06	11	AM	3	2	1.6	1.6	2.0	2.0	2.0	7.5		336		168
74	07/11/74 ACCLIMATING PLANT A (TSC) AND PLANT B (TSS) TO SSRT 10 DAYS AND 25 C														
74	07	11	AM	3	2	1.25	1.25	1.6	1.6	1.6	7.4				
74	08	11	AM	3	2	1.25	1.25	1.6	1.6	1.6					
74	09	11	AM	3	2	1.25	1.25	1.6	1.6	1.6					
74	10	11	AM	3	2	1.25	1.25	1.6	1.6	1.6					
74	11/11/74 ADDED APPROXIMATELY 30 IGAL MLSS FROM B1 TO B2														
74	SSRT PLANT A AND PLANT B CALCULATIONS BASED FROM 11/11/74 ,TO 15/11/74														
74	11	11	AM	3	2	1.25	1.25	1.6	1.6	1.6			158		
74	12/11/74 AMMONIA AND BICARBONATE SPIKE TO TEMPERATURE CONTROLLER START AT														
74	1700 HRS AND STOP 14/11/74 0900 HRS														
74	12	11	AM	3	2	1.25	1.25	1.6	1.6	1.6	7.4		272		
74	13/11/74 ACCLIMATION COMPLETE														

MODE OF OPERATION

YEAR	DATE DAY	DATE MON	TIME	OPERATING MODE A	OPERATING MODE B	FEED RATES A	FEED RATES B	RETURN SLUDGE RATES A	RETURN SLUDGE RATES B1	RETURN SLUDGE RATES B2	---RAW SEWAGE--- PH	TEMP	SS	HACH NH3N ALK
74	13	11	AM	3	2	1.25	1.25	1.6	1.6	1.6	7.7		268	226
74	14/11/74 AMMONIA AND BICARBONATE SPIKE TO TEMPERATURE CONTROLLER START AT													
74	1700 HRS AND STOP 16/11/74 0900 HRS													
74	14/11/74 PLANT A CHANGED FROM (TSC) TO (SSC)													
74	14	11	AM	1	2	1.25	1.25	1.6	1.6	1.6	7.3		320	
74	15	11		1	2	1.25	1.25	1.6	1.6	1.6	7.6	24.0	196	213
74	16/11/74 ACCLIMATING PLANT A (SSC) AND PLANT B (TSS) TO SSRT 10 DAYS AND 10 C													
74	16	11		1	2	1.25	1.25	1.6	1.6	1.6				
74	17	11		1	2	1.25	1.25	1.6	1.6	1.6				
74	18	11		1	2	1.25	1.25	1.6	1.6	1.6	7.1	10.0	220	
74	19	11		1	2	1.25	1.25	1.6	1.6	1.6	7.6	9.0	236	
74	20	11		1	2	1.25	1.25	1.6	1.6	1.6	7.7	9.0	248	
74	21	11		1	2	1.25	1.25	1.6	1.6	1.6	7.9	9.0	134	
74	22	11		1	2	1.25	1.25	1.6	1.6	1.6	8.0	9.0	284	136
74	SSRT PLANT A AND PLANT B CALCULATIONS BASED FROM 23/11/74 ,TO 27/11/74													
74	23/11/74 PLANT A CHANGED FROM SSC SYSTEM TO TSC SYSTEM													
74	23	11		3	2	1.25	1.25	1.6	1.6	1.6			208	
74	24/11/74 AMMONIA AND BICARBONATE SPIKE TO TEMPERATURE CONTROLLER START AT													
74	2200 HRS AND STOP 26/11/74 0900 HRS													
74	24	11		3	2	1.25	1.25	1.6	1.6	1.6			232	
74	25/11/74 ACCLIMATION COMPLETE													
74	25	11		3	2	1.25	1.25	1.6	1.6	1.6	7.6	9.0	524	106
74	26/11/74 PLANT A CHANGED FROM TSC SYSTEM TO SSC SYSTEM													
74	26/11/74 AMMONIA AND BICARBONATE SPIKE TO TEMPERATURE CONTROLLER START AT													
74	1700 HRS AND STOP 28/11/74 0900 HRS													
74	26	11		1	2	1.25	1.25	1.6	1.6	1.6	8.1	9.0	464	
74	27	11		1	2	1.25	1.25	1.6	1.5	1.6	7.7	9.0	368	118
74	28	11		1	2	1.25	1.25	1.6	1.6	1.6				
74	29	11		1	2	1.25	1.25	1.6	1.6	1.6				
74	30	11		1	2	1.25	1.25	1.6	1.6	1.6				
74	01	12		1	2	1.25	1.25	1.6	1.6	1.6				
74	02/12/74 CHANGE TEMPERATURE FROM 10 C TO 5 C IN SYSTEM A AND B													
74	02/12/74 TO 14/12/74 SCREENING EXPERIMENTS TO STUDY RESPONSE OF SYSTEMS TO													
74	TEMPERATURE CHANGES													
74	02	12		1	2	1.25	1.25	1.6	1.6	1.6	7.5	10.0	344	
74	03	12		1	2	1.25	1.25	1.6	1.6	1.6	7.5	3.0	312	
74	04/12/74 MLSS COMING IN RAW SEWAGE,PLANT DOWN APPROXIMATELY 3 HRS													
74	04	12		1	2	1.25	1.25	1.6	1.6	1.6	7.6	2.0	864	
74	04/12/74 CHANGE TEMPERATURE FROM 5 C TO 10 C IN SYSTEM A AND B													
74	05	12		1	2	1.25	1.25	1.6	1.6	1.6		10.0		
74	06	12		1	2	1.25	1.25	1.6	1.6	1.6		10.0		
74	07	12		1	2	1.25	1.25	1.6	1.6	1.6				
74	08	12		1	2	1.25	1.25	1.6	1.6	1.6				
74	09/12/74 CHANGE TEMPERATURE FROM 10 C TO 5 C IN SYSTEM A AND B ,DYNAMIC STUDY													
74	BEGAN													
74	09	12		1	2	1.25	1.25	1.6	1.6	1.6	7.7	5.0	156	
74	10	12		1	2	1.25	1.25	1.6	1.6	1.6	7.7	2.5	64	
74	11	12		1	2	1.25	1.25	1.6	1.6	1.6	7.6	2.5	[illegible]	

MODE OF OPERATION

YEAR	DATE DAY	DATE MON	TIME	OPERATING MODE A	OPERATING MODE B	FEED RATES A	FEED RATES B	RETURN SLUDGE RATES A	RETURN SLUDGE RATES B1	RETURN SLUDGE RATES B2	RAW SEWAGE PH	RAW SEWAGE TEMP	RAW SEWAGE SS	RAW SEWAGE HACH NH3N	RAW SEWAGE ALK
74	12	12		1	2	1.25	1.25	1.6	1.6	1.6	5.8	2.5	120		
74	13	12		1	2	1.25	1.25	1.6	1.6	1.6	7.6	2.5	188		
74	14/12/74 END OF DYNAMIC RUN, CHANGE TEMPERATURE FROM 5 C TO 10 C IN SYSTEM A AND B														
74	14	12		1	2	1.25	1.25	1.6	1.6	1.6					
74	15	12		1	2	1.25	1.25	1.6	1.6	1.6					
74	16	12		1	2	1.25	1.25	1.6	1.6	1.6		10.0			
74	17/12/74 TO 21/12/74 SCREENING EXPERIMENTS TO STUDY RESPONSE OF SYSTEMS TO INCREASE IN FLOW RATE														
74	17	12		1	2	1.25	1.25	1.6	1.6	1.6	7.7	10.0	256		
74	18	12		1	2	1.25	1.25	1.6	1.6	1.6			252		
74	19	12		1	2	1.25	1.25	1.6	1.6	1.6		10.0			
74	20	12		1	2	1.25	1.25	1.6	1.6	1.6			244		
74	21/12/74 DUMPED BOTH A AND B SYSTEMS IN PREPARATION FOR DYE STUDIES														
75	13/01/75 PLANT SEEDED TEMP 15 C BOTH A AND B SYSTEMS														
75	13/01/75 TO 27/01/75 START-UP AND ACCLIMATION PROCEDURES IN PREPARATION FOR FURTHER NON-STEADY SCREENING EXPERIMENTS														
75	13	01		1	2	1.0	1.0	1.25	1.25	1.25		15.0			
75	14	01		1	2	1.0	1.0	1.25	1.25	1.25					
75	15/01/75 CHANGE TEMPERATURE FROM 15 C TO 10 C SYSTEM A AND B, SET SSRT 7-10 DAYS														
75	15	01		1	2	1.0	1.0	1.25	1.25	1.25		15.0			
75	16	01		1	2	1.0	1.0	1.25	1.25	1.25	7.7	14.0			
75	17	01		1	2	1.0	1.0	1.25	1.25	1.25	6.0	14.0			
75	18	01		1	2	1.0	1.0	1.25	1.25	1.25					
75	19	01		1	2	1.0	1.0	1.25	1.25	1.25					
75	20	01 RETURN SLUDGE PUMP B1 LEFT OFF OVERNIGHT													
75	20	01		1	2	1.0	1.0	1.25	1.25	1.25	7.7	8.0	308		
75	21	01		1	2	1.25	1.25	1.6	1.6	1.6	8.1	8.0			
75	22/01/75 PLANT ON RECYCLE(1100 HRS),RAW SEWAGE LINE RUPTURED														
75	22	01		1	2	1.25	1.25	1.6	1.6	1.6	6.7	8.0			
75	23/01/75 RAW SEWAGE BACK ON (2030 HRS)														
75	23	01		1	2	1.25	1.25	1.6	1.6	1.6					
75	24	01		1	2	1.0	1.0	1.25	1.25	1.25	7.5	9.0			
75	25	01		1	2	1.0	1.0	1.25	1.25	1.25					
75	26	01		1	2	1.0	1.0	1.25	1.25	1.25					
75	27	01		1	2	1.0	1.0	1.25	1.25	1.25		9.0			
75	28/01/75 TO 30/01/75 VARIABLE HYDRAULIC AND ORGANIC LOADING SCREENING EXPERIMENT FEED RATES AS PER FIG. 34,SSC SSRT APPROXIMATELY 9 DAYS														
75	28	01		1	2			1.25	1.25	1.25					
75	29	01		1	2			1.25	1.25	1.25					
75	30/01/75 PLANTS ON RECYCLE FOR APPROXIMATELY 5 HRS.RAW SEWAGE INTERRUPTION														
75	30/01/75 ACCLIMATING PLANT A (SSC) AND PLANT B (TSS) TO SSRT 4 DAYS AND 10 C														
75	30	01		1	2	2.0	2.0	2.5	2.5	2.5					
75	31	01		1	2	2.0	2.0	2.5	2.5	2.5					
75	01	02		1	2	2.0	2.0	2.5	2.5	2.5					
75	02	02		1	2	2.0	2.0	2.5	2.5	2.5					
75	03	02		1	2	2.0	2.0	2.5	2.5	2.5	4.0	10.0			
75	04	02		1	2	2.0	2.0	2.5	2.5	2.5	3.8	8.0			

MODE OF OPERATION

YEAR	DAY	MON	TIME	OPERATING MODE A	OPERATING MODE B	FEED RATES A	FEED RATES B	RETURN SLUDGE RATES A	RETURN SLUDGE RATES B1	RETURN SLUDGE RATES B2	RAW SEWAGE PH	RAW SEWAGE TEMP	RAW SEWAGE SS	RAW SEWAGE HACH NH3N	RAW SEWAGE ALK
75	05 02 RAW SEWAGE LINE RUPTURED PLANT ON RECYCLE FOR APPROX 5.5 HRS														
75	05/02/75 MLSS FOUND IN TEMPERATURE CONTROLLER AND GRIT CHAMBER														
75	05	02		1	2	2.0	2.0	2.5	2.5	2.5	7.5				
75	06	02		1	2	2.0	2.0	2.5	2.5	2.5		8.5			
75	SSRT PLANT A AND PLANT B CALCULATIONS BASED FROM 07/02/75 ,TO 10/02/75														
75	07	02		1	2	2.0	2.0	2.5	2.5	2.5		9.0			
75	08/02/75 ACCLIMATION COMPLETE														
75	08	02		1	2	2.0	2.0	2.5	2.5	2.5					
75	09	02		1	2	2.0	2.0	2.5	2.5	2.5					
75	10	02		1	2	2.0	2.0	2.5	2.5	2.5		8.0	384		112
75	11	02		3	2	1.25	1.25	1.6	1.6	1.6		8.0			
75	11/02/75 ACCLIMATING PLANT A (TSC) AND PLANT B (TSS) TO SSRT 10 DAYS AND 10 C														
75	12	02		3	2	1.25	1.25	1.6	1.6	1.6					
75	13	02		3	2	1.25	1.25	1.6	1.6	1.6		8.0			
75	14	02		3	2	1.25	1.25	1.6	1.6	1.6		8.0			
75	15	02		3	2	1.25	1.25	1.6	1.6	1.6					
75	16	02		3	2	1.25	1.25	1.6	1.6	1.6					
75	SSRT PLANT A AND PLANT B CALCULATIONS BASED FROM 17/02/75 ,TO 20/02/75														
75	17	02		3	2	1.25	1.25	1.6	1.6	1.6		8.0			
75	18	02		3	2	1.25	1.25	1.6	1.6	1.6		8.0			
75	19/02/75 AMMONIA AND BICARBONATE SPIKE TO TEMPERATURE CONTROLLER START AT														
75	1700 HRS AND STOP 21/02/75 0900 HRS														
75	19	02		3	2	1.25	1.25	1.6	1.6	1.6		8.0			
75	20/02/75 ACCLIMATION COMPLETE														
75	20	02		3	2	1.25	1.25	1.6	1.6	1.6		8.0	180		107
75	21/02/75 ACCLIMATING PLANT A (SSC) AND PLANT B (TSS) TO SSRT 10 DAYS AND 15 C														
75	21	02		1	2	1.25	1.25	1.6	1.6	1.6					
75	22	02		1	2	1.25	1.25	1.6	1.6	1.6		15.0			
75	SSRT PLANT A AND PLANT B CALCULATIONS BASED FROM 23/02/75 ,TO 26/02/75														
75	23	02		1	2	1.25	1.25	1.6	1.6	1.6		14.0			
75	24	02		1	2	1.25	1.25	1.6	1.6	1.6		14.0			
75	25/02/75 ACCLIMATION COMPLETE														
75	25/02/75 AMMONIA AND BICARBONATE SPIKE TO TEMPERATURE CONTROLLER START AT														
75	1700 HRS AND STOP 27/02/75 0900 HRS														
75	25	02		1	2	1.25	1.25	1.6	1.6	1.6		14.0			
75	26	02		1	2	1.25	1.25	1.6	1.6	1.6		14.0	200.		109
75	26/02/75 AUTOMATIC SLUDGE WASTING BEGAN FOR 31														
75	27/02/75 AUTOMATIC SLUDGE WASTING BEGAN FOR A														
75	27	02		1	2	1.0	1.0	1.25	1.25	1.25		14.0			
75	28	02		1	2	1.0	1.0	1.25	1.25	1.25		14.0			
75	01	03		1	2	1.0	1.0	1.25	1.25	1.25					
75	02	03		1	2	1.0	1.0	1.25	1.25	1.25					
75	03	03		1	2	1.0	1.0	1.25	1.25	1.25		14.0		23	117
75	03/03/75 TO 08/03/75 (0900) EXPERIMENT 01														
75	SSRT PLANT A AND PLANT B CALCULATIONS BASED FROM 03/03/75 TO 07/03/75														
75	04/03/75 TEMPERATURE SET IN TEMPERATURE CONTROLLER FROM 15 C TO 10 C AT 0900														
75	TEMP CHANGES IN REACTORS GIVEN FIG.22														
75	04	03		1	2	1.0	1.0	1.25	1.25	1.25		14.0		28	110

MODE OF OPERATION

YEAR	DATE DAY	MON	TIME	OPERATING MODE A	B	FEED RATES A	B	RETURN SLUDGE RATES A	B1	B2	RAW SEWAGE PH	TEMP	SS	HACH NH3N	ALK
75	05	03		1	2	1.0	1.0	1.25	1.25	1.25		8.0		29	110
75	06	03		1	2	1.0	1.0	1.25	1.25	1.25		8.0		27	115
75	07/03/75 END OF DYNAMIC EXPERIMENT D1														
75	07	03		1	2	1.0	1.0	1.25	1.25	1.25		8.0		28	111
75	08/03/75 CHANGE TEMPERATURE A AND B SYSTEM FROM 10 C TO 15 C ,BEGIN ACCLIMAT-ION FOR EXPERIMENT D2,PLANT A (SSC) AND PLANT B (TSS) TO SSRT OF 3 TO 4 DAYS AND 15 C														
75	08	03		1	2	1.0	1.0	1.25	1.25	1.25					
75	09	03	AM	WASTING PROCEDURE CHANGED FOR B1. WASTING NOW FROM RS LINE INSTEAD											
75	09	03		OF MLSS FROM THE AERATION TANK											
75	09	03		1	2	1.0	1.0	1.25	1.25	1.25					
75	10	03		1	2	1.0	1.0	1.25	1.25	1.25		14.0			
75	11/03/75 TO 19/03/75 (0900) EXPERIMENT D2 PH CHANGES IN REACTORS GIVEN FIG.23														
75	11	03		1	2	1.0	1.0	1.25	1.25	1.25		14.0		35	
75	12	03		1	2	1.0	1.0	1.25	1.25	1.25		14.0		27	
75	13	03		1	2	1.0	1.0	1.25	1.25	1.25		14.0		23	108
75	14	03		1	2	1.0	1.0	1.25	1.25	1.25		14.0		23	124
75	15	03		1	2	1.0	1.0	1.25	1.25	1.25		14.0			127
75	NO GRAB SAMPLE EVERY 3 HRS ON EB1 FOR 15,16,17 MAR.THESE DAYS SHOULD REPRESENT STEADY STATE CONDITIONS AS PER PMS														
75	16	03		1	2	1.0	1.0	1.25	1.25	1.25		14.0		24	123
75	17	03		1	2	1.0	1.0	1.25	1.25	1.25		14.0			114
75	18	03		1	2	1.0	1.0	1.25	1.25	1.25		14.0		40	109
75	19/03/75 BEGIN ACCLIMATION FOR EXPERIMENT D3,PLANT A (SSC) AND PLANT B (TSS) TO SSRT OF 3 TO 4 DAYS AND 15 C														
75	19	03		1	2	1.0	1.0	1.25	1.25	1.25		14.0			
75	20	03		1	2	1.0	1.0	1.25	1.25	1.25		14.0			
75	21	03		1	2	1.0	1.0	1.25	1.25	1.25					
75	22	03		1	2	1.0	1.0	1.25	1.25	1.25					
75	23/03/75 FEED A AND B AND RETURN SLUDGE B2 PUMPS FOUND OFF IN AM,APPROXIMATELY 20 HRS														
75	23	03		1	2	1.0	1.0	1.25	1.25	1.25					
75	24/03/75 TO 28/03/75 (0900) EXPERIMENT D3														
75	SSRT PLANT A AND PLANT B CALCULATIONS BASED FROM 24/03/75 TO 27/03/75														
75	24	03		1	2	1.0	1.0	1.25	1.25	1.25	7.6	14.0	244	12	104
75	25	03		1	2						7.8	14.0	284	12	112
75	26	03		1	2						7.7	14.0	236	17	118
75	27	03		1	2						7.2	14.0	336		123
75	28/03/75 BEGIN ACCLIMATION FOR EXPERIMENT D4,PLANT A(SSC) AND PLANT B (TSS) TO SSRT OF 3 TO 4 DAYS AND 15 C														
75	28	03		1	2	1.0	1.0	1.25	1.25	1.25					
75	29	03		1	2	1.0	1.0	1.25	1.25	1.25					
75	30	03		1	2	1.0	1.0	1.25	1.25	1.25					
75	31	03		1	2	1.0	1.0	1.25	1.25	1.25					
75	01	04		1	2	1.0	1.0	1.25	1.25	1.25					
75	02	04		1	2	1.0	1.0	1.25	1.25	1.25		15.0			
75	03	04		1	2	1.0	1.0	1.25	1.25	1.25		15.0			

MODE OF OPERATION

YEAR	DATE DAY	MON	TIME	OPERATING MODE A	B	FEED RATES A	B	RETURN SLUDGE RATES A	B1	B2	RAW SEWAGE PH	TEMP	SS	HACH NH3N	ALK
75	04	04		1	2	1.0	1.0	1.25	1.25	1.25		14.0			
75	05	04		1	2	1.0	1.0	1.25	1.25	1.25					
75	06	04		1	2	1.0	1.0	1.25	1.25	1.25					
75	07/04/75 TO 11/04/75 (0900) EXPERIMENT D4														
75	SSRT PLANT A AND PLANT B CALCULATIONS BASED FROM 07/04/75 TO 10/04/75														
75	07	04		1	2						7.5	14.0	196	16	121
75	08	04		1	2						7.5	14.0	220	48	134
75	09	04		1	2						7.8	13.0	266	21	125
75	10	04		1	2						7.9	13.0	391	21	130
75	11/04/75 BEGIN ACCLIMATION FOR EXPERIMENT D5,PLANT A(SSC) AND PLANT B (TSS) TO														
75	SSRT OF 3 TO 4 DAYS AND 15 C														
75	11	04		1	2							13.0			
75	12	04		1	2	1.0	1.0	1.25	0.3	1.25					
75	13	04		1	2	1.0	1.0	1.25	0.3	1.25					
75	14	04		1	2	1.0	1.0	1.25	0.3	1.25					
75	15/04/75 TO 25/04/75 (0900) EXPERIMENT D5														
75	SSRT PLANT A AND PLANT B CALCULATIONS BASED FROM 15/04/75 TO 24/04/75														
75	26/04/75 ACCLIMATING PLANT A (SSC) AND PLANT B (TSS) TO SSRT 4 DAYS AND 15 C														
75	15/04/75 TO 25/04/75 ORGANIC CARBON (DEXTROSE) AND INORGANIC NITROGEN (NH4CL)														
75	WITH BICARBONATE ADDITION ADDED TO TEMPERATURE CONTROLLER ACCORDING TO														
75	EXPERIMENTAL DESIGN D5.														
75	15	04	0900	1	2	1.0	1.0	1.25	0.3	1.25	7.5	14.0	332		250
75	15	04	2300	1	2	2.0	2.0	2.50	0.7	2.5					
75	16	04	2300	1	2	1.0	1.0	1.25	0.3	1.25					
75	17	04	1100	1	2	2.0	2.0	2.5	0.7	2.5	6.9	11.0	194	15	213
75	17	04	2300	1	2	1.0	1.0	1.25	0.3	1.25					
75	18	04	2300	1	2	2.0	2.0	2.5	0.7	2.5					
75	19	04	1100	1	2	1.0	1.0	1.25	0.3	1.25	7.0	11.0	170		203
75	20	04	1100	1	2	2.0	2.0	2.5	0.7	2.5	7.0	12.0	135		197
75	21	04	1100	1	2	1.0	1.0	1.25	0.3	1.25	7.8	10.5	144		306
75	22	04	1100	1	2	2.0	2.0	2.5	0.7	2.5	7.6	10.5	162		274
75	23	04	1100	1	2	1.0	1.0	1.25	0.3	1.25	7.0	10.5	258		214
75	23	04	2300	1	2	2.0	2.0	2.5	0.7	2.5					
75	24	04	1100	1	2	1.0	1.0	1.25	0.3	1.25	7.4	10.0	272		224
75	24	04	2300	1	2	2.0	2.0	2.5	0.7	2.5					
75	16	04	0900	1	2	2.0	2.0	2.5	0.7	2.5	7.5	10.0	334.		292
75	18	04	0900	1	2	1.0	1.0	1.25	0.3	1.25	7.4	11.0	170		244
75	25	04	0900	1	2	2.0	2.0	2.5	0.7	2.5		10.0	236		
75	26	04		1	2	2.0	2.0	2.5	2.5	2.5		24.0			
75	27	04		1	2	2.0	2.0	2.5	2.5	2.5		24.0			
75	28	04		1	2	2.0	2.0	2.5	2.5	2.5		24.0			
75	29	04		1	2	2.0	2.0	2.5	1.0	2.5		24.0			
75	30	04		1	2	2.0	2.0	2.5	1.0	2.5		24.0			
75	01	05		1	2	2.0	2.0	2.5	1.0	2.5		23.0	309		
75	02	05		1	2	2.0	2.0	2.5	1.0	2.5		22.0	608		
75	03	05		1	2	2.0	2.0	2.5	1.0	2.5					
75	04/05/75 AMMONIA AND BICARBONATE SPIKE TO TEMPERATURE CONTROLLER START AT														
75	2200 HRS AND STOP 06/05/75 0900 HRS														

MODE OF OPERATION

YEAR	DAY MON	TIME	OPERATING MODE A	OPERATING MODE 3	FEED RATES A	FEED RATES B	RETURN SLUDGE RATES A	B1	B2	RAW SEWAGE PH	TEMP	SS (HACH NH3N)	ALK
75	04 05		1	2	2.0	2.0	2.5	1.0	2.5				
75	SSRT PLANT A AND PLANT B CALCULATIONS BASED FROM 05/05/75 ,TO 07/05/75												
75	05/05/75 ACCLIMATION COMPLETE												
75	05 05		1	2	2.0	2.0	2.5	1.0	2.5	7.4	23.0	350	363
75	06/05/75 PLANT A CHANGED FROM SSC SYSTEM TO TSC SYSTEM												
75	06/05/75 AMMONIA AND BICARBONATE SPIKE TO TEMPERATURE CONTROLLER START AT												
75	1700 HRS AND STOP 08/05/75 0900 HRS												
75	06 05		3	2	2.0	2.0	2.5	1.0	2.5		24.0	360	
75	07 05		3	2	2.0	2.0	2.5	1.0	2.5	7.6	23.0	158	337
75	08/05/75 BEGIN ACCLIMATION FOR EXPERIMENT 06,PLANT A (SSC) AND PLANT B (TSS)												
75	TO SSRT OF 3 TO 4 DAYS AND 13 C												
75	08 05		1	2	1.0	1.0	1.25	0.3	1.25		23.0	236	
75	09 05		1	2	1.0	1.0	1.25	0.3	1.25			236	
75	10 05		1	2	1.0	1.0	1.25	0.3	1.25				
75	11 05		1	2	1.0	1.0	1.25	0.3	1.25				
75	12/05/75 TO 16/05/75 (0900) EXPERIMENT 06												
75	SSRT PLANT A AND PLANT B CALCULATIONS BASED FROM 12/05/75 TO 15/05/75												
75	12 05		1	2	1.0	1.0	1.25	0.3	1.25	7.6	11.0	182	278
75	13 05		1	2	2.0	2.0	2.5	0.7	2.5	7.5	11.0	268	271
75	14 05		1	2	2.0	2.0	2.5	0.7	2.5	7.6	11.0	214	250
75	15 05		1	2	2.0	2.0	2.5	0.7	2.5	7.4	11.0	320	249
75	16/05/75 TO 22/05/75 PLANTS OPERATED TO PROVIDE NITRIFIED EFFLUENT ONLY												
75	16 05		1	2	1.5	1.5	1.0	0.3	1.0			304	
75	17 05		1	2	1.5	1.5	1.0	0.3	1.0				
75	18 05		1	2	1.5	1.5	1.0	0.3	1.0				
75	19 05		1	2	1.5	1.5	1.0	0.3	1.0				
75	20 05		1	2	1.5	1.5	1.0	0.3	1.0				
75	21 05		1	2	1.5	1.5	1.0	0.3	1.0				
75	22/05/75 BEGIN ACCLIMATION FOR EXPERIMENT 07,PLANT A (SSC) AND PLANT B (TSS)												
75	TO SSRT OF 3 TO 4 DAYS AND 13 C												
75	22 05		1	2	1.0	1.0	1.25	0.3	1.25				
75	23 05		1	2	1.0	1.0	1.25	0.3	1.25			84	
75	24 05		1	2	1.0	1.0	1.25	0.3	1.25				
75	25 05		1	2	1.0	1.0	1.25	0.3	1.25				
75	26/05/75 TO 30/05/75 (0900) EXPERIMENT 07												
75	SSRT PLANT A AND PLANT B CALCULATIONS BASED FROM 26/05/75 TO 29/05/75												
75	26 05		1	2	1.0	1.0	1.25	0.3	1.25	7.2	13.0	196	250
75	27 05		1	2	1.0	1.0	1.25	0.3	1.25	6.6	10.0	174	200
75	28 05		1	2	1.0	1.0	1.25	0.3	1.25	6.8	11.0	196	207
75	29 05		1	2	1.0	1.0	1.25	0.3	1.25	6.7	11.0	324	207
75	30/05/75 BEGIN ACCLIMATION FOR EXPERIMENT 08,PLANT A (SSC) AND PLANT B (TSS)												
75	TO SSRT OF 3 TO 4 DAYS AND 13 C												
75	30 05		1	2	1.0	1.0	1.25	0.3	1.25			172	
75	31 05		1	2	1.0	1.0	1.25	0.3	1.25				
75	01 06		1	2	1.0	1.0	1.25	0.3	1.25				
75	02/06/75 TO 06/06/75 (0900) EXPERIMENT 08												
75	SSRT PLANT A AND PLANT B CALCULATIONS BASED FROM 02/06/75 TO 05/06/75												
75	02 06		1	2	1.0	1.0	1.25	0.3	1.25	7.8	11.0	184	282

MODE OF OPERATION

YEAR	DATE DAY	DATE MON	TIME	OPERATING MODE A	OPERATING MODE B	FEED RATES A	FEED RATES B	RETURN SLUDGE RATES A	RETURN SLUDGE RATES B1	RETURN SLUDGE RATES B2	RAW SEWAGE PH	RAW SEWAGE TEMP	RAW SEWAGE SS	RAW SEWAGE HACH NH3N	RAW SEWAGE ALK
75	03	06		1	2	1.0	1.0	1.25	0.3	1.25	8.2	11.0	154		335
75	04	06		1	2	1.0	1.0	1.25	0.3	1.25	8.0	11.0	252		302
75	05/06/75 ACCLIMATING PLANT A (SSC) AND PLANT B (TSS) TO SSRT 10 DAYS AND 20 C														
75	05	06		1	2	1.0	1.0	1.25	0.3	1.25	7.0	10.0	184		255
75	06	06		1	2	1.0	1.0	1.25	0.3	1.25		11.0	120		
75	07	06		1	2	1.0	1.0	1.25	0.3	1.25					
75	08	06		1	2	1.0	1.0	1.25	0.3	1.25					
75	09	06		1	2	1.25	1.25	1.6	1.6	1.6					
75	10	06		1	2	1.25	1.25	1.6	1.6	1.6					
75	11	06		1	2	1.25	1.25	1.6	1.6	1.6					
75	12	06		1	2	1.25	1.25	1.6	1.6	1.6		16.0			
75	13	06		1	2	1.25	1.25	1.6	1.6	1.6		16.0			
75	14	06		1	2	1.25	1.25	1.6	1.6	1.6		16.0			
75	15	06		1	2	1.25	1.25	1.6	1.6	1.6		17.0			
75	16	06		1	2	1.25	1.25	1.6	1.6	1.6		17.0			
75	SSRT PLANT A AND PLANT B CALCULATIONS BASED FROM 17/06/75 ,TO 20/06/75														
75	17	06		1	2	1.25	1.25	1.6	1.6	1.6		17.0			
75	18	06		1	2	1.25	1.25	1.6	1.6	1.6		17.0			
75	19/06/75 PLANT A CHANGED FROM SSC SYSTEM TO TSC SYSTEM														
75	19/06/75 AMMONIA AND BICARBONATE SPIKE TO TEMPERATURE CONTROLLER START AT														
75	1700 HRS AND STOP 21/06/75 0900 HRS														
75	19	06		3	2	1.25	1.25	1.6	1.6	1.6		18.0			
75	20/06/75 ACCLIMATION COMPLETE														
75	20	06		3	2	1.25	1.25	1.6	1.6	1.6	7.4	18.0	148		405
75	21/06/75 ACCLIMATE PLANT A (SSC) AND PLANT B (INSTALL 3 BAFFLES FOR FSC SYSTEM														
75	) TO SSRT OF 3 TO 4 DAYS AND 13 C														
75	21/06/75 RETURN SLUDGE-PLANT B-NOW ENTERING INTO FIRST COMPARTMENT,BUT STILL														
75	IS LISTED UNDER HEADING B2														
75	21	06		1	4	1.0	1.0	1.25		1.25					
75	22	06		1	4	1.0	1.0	1.25		1.25					
75	23	06		1	4	1.0	1.0	1.25		1.25					
75	24	06		1	4	1.0	1.0	1.25		1.25					
75	25	06		1	4	1.0	1.0	1.25		1.25					
75	26	06		1	4	1.0	1.0	1.25		1.25			212		
75	27/06/75 UNABLE TO ATTAIN 13 C IN SYSTEMS,THEREFORE INCREASE TEMP TO 20 C AND														
75	ACCLIMATE AT THIS TEMP														
75	27	06		1	4	1.0	1.0	1.25		1.25			171		
75	28	06		1	4	1.0	1.0	1.25		1.25					
75	29	06		1	4	1.0	1.0	1.25		1.25					
75	30	06		1	4	1.0	1.0	1.25		1.25			124		
75	SSRT PLANT A AND PLANT B CALCULATIONS BASED FROM 30/06/75 TO 03/07/75														
75	01/07/75 TO 03/07/75 (0900) EXPERIMENT 09														
75	01	07	AM	1	4	1.0	1.0	1.25		1.25			155		272
75	01	07	PM	1	4	1.0	1.0	1.25		1.25			205		
75	02	07	AM	1	4	1.0	1.0	1.25		1.25			248		302
75	02	07	PM	1	4	1.0	1.0	1.25		1.25			412		
75	03	07	AM	1	4	1.0	1.0	1.25		1.25			284		253
75	03	07	PM	1	4	1.0	1.0	1.25		1.25			184		

MODE OF OPERATION

DATE				OPERATING MODE		FEED RATES		RETURN SLUDGE RATES			RAW SEWAGE			
YEAR	DAY	MON	TIME	A	B	A	B	A	B1	B2	PH	TEMP	SS	HACH NH3N ALK
75	END OF EXPERIMENTAL PROGRAM													

STOP

Reactor Operating Results

YEAR	DAY	MON	TIME	REACTOR	MLSS	VSS	WASTE CONC	IGAL WASTE	EFFLUENT SS	EFFLUENT ALK	EFFLUENT NH3N	EFFLUENT NO3N HACH	PH	TEMP	30 MIN SET	DO	OUR
73	ALL OXYGEN UPTAKE RATES WERE CARRIED OUT IN PM OF EACH DAY. THE MLSS VALUE																
73	USED IN THE OXYGEN UP-TAKE RATE CALCULATION IS AN AVERAGE OF AN AM AND PM																
73	SAMPLE.THE OXYGEN UP-TAKE RATE (MG OXYGEN PER MG MLSS PER HOUR) IS																
73	RECORDED ON THE AM CARD EACH RATE DAY.																
73	09	11	0900	A	5430	3420	11860	58	262				7.4	5.5	325	11.3	
73	09	11	1500	A	5260	3400											
73	10	11	AM	A	4160	3130											
73	11	11	1100	A	5290	3520	10860	58	81								
73	13	11	AM	A	5210	3520			85				7.3	12.0	390	5.8	
73	14	11	AM	A	5440	3810	11720	52	98		10		7.3	5.5	345	8.3	
73	15	11	ASSUME EA SUSPENDED SOLIDS = 50 MG/L BASED ON AVERAGE DAILY VALUE														
73	15	11	AM	A	5730	3790	9770	58	50	199	17		7.4	6.0	290	6.5	1.21
73	16	11	AM	A	5480		11470	58	85		8		7.2	5.5	285	8.1	
73	17	11	AM	A	4390				43								
73	18	11	1145	A	5470				43								
73	19	11	ASSUME EA SUSPENDED SOLIDS = 50 MG/L BASED ON AVERAGE DAILY VALUE														
73	19	11	AM	A	5610	3790	9830	32	50	209	11		7.2	5.0	540	5.4	2.13
73	19	11	PM	A	5480	3750											
73	20	11	ASSUME EA SUSPENDED SOLIDS = 50 MG/L BASED ON AVERAGE DAILY VALUE														
73	20	11	AM	A	5680		9280	72	50				7.4	5.0		7.4	
73	21	11	AM	A	5670		10800	58	93				7.4	5.0	320	8.4	
74	24	01	AM	A	5960		9170	30	34				7.4	4.5		4.3	
74	25	01	AM	A	4410		7760	13	25		6	3	7.3	4.5		2.3	
74	26	01	AM	A	4340		8070	60									
74	27	01	AM	A	4720		10480	20	27					4.8		3.7	
74	28	01	AM	A	4830				40		6	7	7.2	4.8		3.0	
74	29	01	AM	A	5550	3610	9640	20	38	170			7.1	5.3	350	2.7	1.92
74	29	01	PM	A	5400		9310	15									
74	30	01	AM	A	5570		9320	20	38				7.4	5.5		2.7	
74	30	01	PM	A			8680	20									
74	31	01	0900	A	5290	3460	9650	20									
74	31	01	1200	A	4900		9630	20									
74	31	01	1500	A	6000	4030	9320										
74	31	01	1800	A	5040		9530										
74	31	01	2100	A	5330		9630										
74	31/01/74 EFFLUENT SUSPENDED SOLIDS APPEAR HIGH,THIS IS DUE TO SLUDGE BLANKET																
74	RISING TO WEIR LEVEL																
74	31	01	AM	A	5310		9650	20	191	156			7.4	4.8	380	5.2	2.75
74	31	01	PM	A			9630	20									
74	01	02	0900	A	5300		10200										
74	01	02	AM	A	5300		10200	20	105				7.3	4.8		4.3	
74	01	02	PM	A			10200	20									
74	02	02	AM	A	4870		9040	40	30				7.7	4.5		6.3	
74	03	02	AM	A	4700		13140	30	32								
74	04	02	0900	A	5050	3610	9280										
74	04	02	1200	A	5480		10360										
74	04	02	1500	A	4860	3380	9530	20									
74	04	02	1800	A	4730		9800										

REACTOR OPERATING RESULTS

YEAR	DATE DAY	DATE MON	TIME	REACTOR	MLSS	VSS	WASTE CONC	IGAL WASTE	EFFLUENT SS	EFFLUENT ALK	EFFLUENT NH3N HACH	EFFLUENT NO3N HACH	PH	TEMP	30 MIN SET	DO	OUR
73	ALL OXYGEN UPTAKE RATES WERE CARRIED OUT IN PM OF EACH DAY. THE MLSS VALUE																
73	USED IN THE OXYGEN UP-TAKE RATE CALCULATION IS AN AVERAGE OF AN AM AND PM																
73	SAMPLE.THE OXYGEN UP-TAKE RATE (MG OXYGEN PER MG MLSS PER HOUR) IS																
73	RECORDED ON THE AM CARD EACH RATE DAY.																
73	09	11	0900	A	5430	3420	11860	58	262				7.4	5.5	325	11.3	
73	09	11	1500	A	5260	3400											
73	10	11	AM	A	4160	3130											
73	11	11	1100	A	5290	3520	10860	58	81								
73	13	11	AM	A	5210	3520			85				7.3	12.0	392	5.6	
73	14	11	AM	A	5440	3810	11720	52	98		10		7.3	5.5	345	8.3	
73	15	11	ASSUME EA SUSPENDED SOLIDS = 50 MG/L BASED ON AVERAGE DAILY VALUE														
73	15	11	AM	A	5730	3790	9770	58	50	199	17		7.4	6.0	290	6.5	1.21
73	16	11	AM	A	5480		11470	58	85		8		7.2	5.5	235	8.1	
73	17	11	AM	A	4390				43								
73	18	11	1145	A	5470				43								
73	19	11	ASSUME EA SUSPENDED SOLIDS = 50 MG/L BASED ON AVERAGE DAILY VALUE														
73	19	11	AM	A	5610	3790	9830	32	50	209	11		7.2	5.0	540	5.4	2.13
73	19	11	PM	A	5480	3750											
73	20	11	ASSUME EA SUSPENDED SOLIDS = 50 MG/L BASED ON AVERAGE DAILY VALUE														
73	20	11	AM	A	5680		9280	72	50				7.4	5.0		7.4	
73	21	11	AM	A	5670		10600	58	93				7.4	5.0	320	8.4	
74	24	01	AM	A	5960		9170	30	34				7.4	4.5		4.3	
74	25	01	AM	A	4410		7760	13	25		6	3	7.3	4.5		2.3	
74	26	01	AM	A	4340		8070	60									
74	27	01	AM	A	4720		10480	20	27					4.8		3.7	
74	28	01	AM	A	4830				40		6	7	7.2	4.8		3.0	
74	29	01	AM	A	5550	3610	9640	20	38	170			7.1	5.3	350	2.7	1.92
74	29	01	PM	A	5400		9310	15									
74	30	01	AM	A	5570		9320	20	38				7.4	5.5		2.7	
74	30	01	PM	A			8680	20									
74	31	01	0900	A	5290	3460	9650	20									
74	31	01	1200	A	4900		9630	20									
74	31	01	1500	A	6000	4030	9320										
74	31	01	1800	A	5040		9530										
74	31	01	2100	A	5330		9630										
74	31/01/74 EFFLUENT SUSPENDED SOLIDS APPEAR HIGH,THIS IS DUE TO SLUDGE BLANKET																
74	RISING TO WEIR LEVEL																
74	31	01	AM	A	5310		9650	20	191	156			7.4	4.8	380	5.2	2.75
74	31	01	PM	A			9630	20									
74	01	02	0900	A	5300		10200										
74	01	02	AM	A	5300		10200	20	105				7.3	4.8		4.3	
74	01	02	PM	A			10200	20									
74	02	02	AM	A	4870		9640	40	30				7.7	4.5		[illegible]	
74	03	02	AM	A	4700		13140	30	32								
74	04	02	0900	A	5050	3610	9280										
74	04	02	1200	A	5480		10360										
74	04	02	1500	A	4860	3380	9530	20									
74	04	02	1800	A	4730		9800										

REACTOR OPERATING RESULTS

									-----EFFLUENT---						30		
YEAR	DATE DAY	MON	TIME	REACTOR	MLSS	VSS	WASTE CONC	IGAL WASTE	SS	ALK	NH3N	NO3N HACH	PH	TEMP	MIN SET	DO	OUR
74	04	02	2100	A	4910		9650										
74	04	02	AM	A	5045		8500	20	43	125			7.4	5.0	340	5.9	3.03
74	05	02	0900	A	5120		9910										
74	05/02/74 DUE TO OPERATOR ERROR NO VSS WAS TAKEN, THEREFORE THE VSS VALUE																
74	SHOWN WAS BASED ON A VSS OF 67 PER CENT																
74	05	02	AM	A	5320	3565	9710	31	44				7.2	4.8		4.4	
74	05	02	PM	A			9700	20									
74	21	04	AM	A	5730		12150	21	6								
74	22	04	AM	A	5870				14				7.3	11.0		1.8	
74	22	04	PM	A			10150	21									
74	23	04	AM	A	6250	4450			7	89			7.3	11.0	865	1.9	5.07
74	23	04	PM	A	6070		8650	27									
74	24	04	AM	A	6260				21				7.2	10.0		4.5	
74	24	04	PM	A			9680	35									
74	25	04	AM	A	5780	3940			13	103			7.3	10.3	595	5.2	4.63
74	25	04	PM	A	5390		9870	30									
74	28	04	PM	A	5750		9400	28	14								
74	29	04	AM	A	5130				73				7.2	20.3		6.4	
74	29	04	PM	A			9150	20									
74	30	04	0300	A	6000	3960	12070										
74	30	04	1200	A	5840		12380										
74	30	04	1500	A	5480	3610	12300										
74	30	04	1620	A			10240	20									
74	30	04	1800	A	5000		12100										
74	30	04	2130	A	5060		12170										
74	30	04	AM	A					25	4[illegible]			7.1	20.5	585	3.1	6.55
74	01	05	AM	A			8670	47									
74	01	05	0300	A	5410	3740	12980										
74	01	05	1200	A	5900		12680										
74	01	05	1500	A	5230	3530											
74	01	05	1730	A			10050	15									
74	01	05	1800	A	5000		11570										
74	01	05	2100	A	4960		12510										
74	01	05	AM	A					33	17			5.3	20.0	5[illegible]	3.[illegible]	9.22
74	02	05	AM	A	6770	4520	10820	4	63								
74	03	05	AM	A				10						14.3		6.5	
74	04	05	AM	A				10									
74	05	05	AM	A				11									
74	06	05	AM	A	5740				22				7.3	14.5		4.6	
74	06	05	PM	A			10210	14									
74	07	05	AM	A	6860				23				7.3	14.[illegible]		5.1	
74	07	05	PM	A			11540	20									
74	08	05	AM	A	7430				792				7.1	15.[illegible]		4.[illegible]	
74	08	05	PM	A			9960	20									
74	08	05	PM	A			8640	15									
74	08	05	PM	A				20									
74	09	05	AM	A	4440		8440	25	23								
74	09	05	AM	A			7910	35									

REACTOR OPERATING RESULTS

YEAR	DATE DAY	DATE MON	TIME	REACTOR	MLSS	VSS	WASTE CONC	IGAL WASTE	EFFLUENT SS	EFFLUENT ALK	EFFLUENT NH3N HACH	EFFLUENT NO3N	PH	TEMP	30 MIN SET	DO	OUR
74	09	05	PM	A			9530	30									
74	10	05	AM	A	5150				17				7.3	15.0		6.5	
74	10	05	PM	A			10400	30									
74	11	05	AM	A				30									
74	12	05	PM	A	5310		8960	35	30								
74	13	05	AM	A	4960				21				7.3	15.0		6.2	
74	13	05	PM	A			4680	30									
74	14	05	AM	A	5640	3690			32	109			7.4	15.0	360	5.2	6.49
74	14	05	PM	A	6140		10410	35									
74	15	05	AM	A	5030				31				6.9	15.0		3.4	
74	15	05	PM	A			9360	35									
74	16	05	AM	A	4900	3220			33	91			7.1	14.8	585	3.9	
74	16	05	PM	A	5880		9520	35									
74	17	05	AM	A	6610				935				7.1	8.5		2.3	
74	17	05	PM	A			9990	50									
74	18	05	AM	A				0									
74	26	05	PM	A	5110		9090	45	19								
74	27	05	AM	A	4890		9980	35	266				7.4	7.0		3.0	
74	27	05	1300	A			8700	60									
74	27	05	1600	A			8060	30									
74	28	05	AM	A				20									
74	29	05	AM	A	5020		9350	60	56				7.2	5.5		9.6	
74	29	05	PM	A			8690	60									
74	30	05	AM	A	5130		9830	20	999				7.4	5.8		5.1	
74	30	05	PM	A			9360	30									
74	31	05	AM	A	5640		10600	54	34				7.4	6.0		3.9	
74	31	05	PM	A			9030	40									
74	02	06	AM	A	5010		8650	30	15								
74	03	06	AM	A	6180				24				7.3	7.0		3.0	
74	03	06	PM	A			9390	43									
74	04	06	AM	A	6280	4510			22	207			7.3	6.5	670	4.0	3.07
74	04	06	PM	A	5170		10150	40									
74	05	06	AM	A	5710				14				7.3	6.0		2.7	
74	05	06	PM	A			9990	32									
74	06	06	AM	A	5720	4140	10520	20	83	179			7.3	7.2	460	6.9	3.16
74	06	06	PM	A	6080		10400	20									
74	07	06	AM	A	6400			30					7.1	6.9		6.0	
74	07	06	PM	A				40									
74	08	06	AM	A				30									
74	09	06	AM	A			11940	15									
74	10	06	PM	A	6160		11300	30	8				7.1	10.5		17.0	
74	11	06	AM	A			11670	15									
74	11	06	AM	A	6040		11660	10					7.2	11.5	870	2.2	4.88
74	11	06	PM	A	6870		9860	20									
74	11	06	PM	A			10070	20									
74	12	06	AM	A			10280	30	10				7.1	10.5		3.6	
74	12	06	PM	A			10010	30									
74	13	06	AM	A	5460		8990	30	10	61			6.9	10.0	645	5.7	2.88

REACTOR OPERATING RESULTS

YEAR	DATE DAY	DATE MON	TIME	REACTOR	MLSS	VSS	WASTE CONC	IGAL WASTE	EFFLUENT SS	EFFLUENT ALK	EFFLUENT NH3N HACH	EFFLUENT NO3N	PH	TEMP	30 MIN SET	DO	OUR
74	13	06	PM	A	5900	4330	9860	11					5.8	10.5		2.8	
74	14	06	AM	A	5800		8670	30					7.0	10.5		4.7	
74	14	06	PM	A				30									
74	15	06	AM	A				40									
74	21	06	PM	A				20									
74	22	06	AM	A				40									
74	30	06	AM	A				30									
74	01	07	AM	A	5800				15								
74	01	07	PM	A			5970	30									
74	02	07	AM	A	6190	4620			16	22			6.5	15.0	650	4.7	5.82
74	02	07	PM	A			7130	60									
74	03	07	AM	A	5900				20				5.7	15.0		6.6	
74	03	07	PM	A			6020	71									
74	04	07	AM	A	6090				14				6.0	14.0		5.8	
74	04	07	PM	A			6250	60									
74	05	07	AM	A	7100		10460	37	17	16			5.5	14.0	670	5.4	4.52
74	05	07	PM	A	6180		9640	20						14.0		3.2	
74	06	07	AM	A	6410			40									
74	07	07	AM	A				40									
74	14	07	AM	A	5030		7520	67									
74	15	07	AM	A	5270				14				7.0	14.5		3.0	
74	15	07	PM	A			5600	75									
74	16	07	AM	A	5320	3720	8530	30	15	59			7.1	14.0	235	3.3	2.46
74	16	07	PM	A	5140		7330	45						13.5		2.5	
74	17	07	AM	A	5270		8740	30	14				6.9	14.5		3.2	
74	17	07	PM	A			8800	35									
74	18	07	AM	A	6230	4510	10030	30	21	43			6.8	14.0	300	3.4	6.10
74	18	07	PM	A	5080		8780	45						14.5		2.7	
74	19	07	AM	A	7200		12240	30	56				6.8	14.5		3.6	
74	19	07	1100	A			11370	30									
74	19	07	PM	A			10880	50									
74	10	08	AM	A				40									
74	10	08	AM	A				40									
74	10	08	PM	A				35									
74	11	08	AM	A	8010		11650	70	7								
74	12	08	AM	A	7210		13470	5	8				7.1	20.5		5.4	
74	12	08	PM	A			11780	30									
74	13	08	AM	A	7710	4550			38	8			6.3	21.0	700	5.5	5.04
74	13	08	PM	A	7390		11590	45						21.5		3.7	
74	14	08	PM	A	5810		9060	35	15				6.8	21.0		5.2	
74	15	08	AM	A	5700	3470			23	5			5.3	19.5	330	6.5	5.31
74	15	08	PM	A	5930		9220	35						19.5		6.2	
74	16	08	AM	A	5910			4	23				5.8	17.0		6.3	
74	17	08	AM	A				35									
74	18	08	AM	A	6700				26								
74	18	08	PM	A			10520	35									
74	19	08	AM	A	6240				12				5.9	10.0		6.1	
74	19	08	PM	A			10660	35									

REACTOR OPERATING RESULTS

	DATE						WASTE	IGAL	-----EFFLUENT---						30 MIN		
YEAR	DAY	MON	TIME	REACTOR	MLSS	VSS	CONC	WASTE	SS	ALK	NH3N	NO3N HACH	PH	TEMP	SET	DO	OUR
74	20	08	AM	A	5940	4050	11550	6	8	44			6.6	10.0	880	3.9	7.38
74	20	08	PM	A	5950		9930	30						10.0		3.9	
74	21	08	AM	A	5930		12880	4	7				6.9	9.5		5.2	
74	21	08	PM	A			9490	35									
74	21	08	1600	A			8910	20									
74	22	08	PM	A	6450		9950	40						13.0		1.6	
74	22	08	2100	A			10000	18									
74	22	08	AM	A	6350	4300			12	35			6.8	13.0	880	2.8	6.56
74	23	08	AM	A	5820		11230	4					6.6	12.0		3.5	
74	26	08	PM	A				40									
74	27	08	AM	A	9600				21				6.3	11.5		4.0	
74	27	08	PM	A			13260	25									
74	28	08	AM	A	9460				10				6.8	10.0		6.5	
74	28	08	PM	A			10600		40								
74	29	08	AM	A	8926				8				7.2	10.5		5.3	
74	29	08	PM	A	9300								.	10.0		5.7	
74	30	08	AM	A	9160								6.8	10.5		5.5	
74	30	08	PM	A				44									
74	30	08	2130	A				74									
74	31	08	AM	A				56									
74	01	09	AM	A	7970		13790	56	11								
74	02	09	AM	A	6940		12400	30	25								
74	03	09	AM	A	6680				17				7.0	25.0		3.6	
74	03	09	PM	A			12340	30									
74	04	09	AM	A	6640				21				7.0	2.5	0	2.6	
74	04	09	PM	A			12330	35									
74	05	09	AM	A	7010				16				7.2	25.0		1.5	
74	05	09	PM	A			6640	35									
74	06	09	AM	A	7450	4700	12340	40	7	31			6.7	24.5	850	0.5	10.20
74	06	09	PM	A	7180		12320	30								4.6	
74	06	09	PM	A	7180		12320	30								4.6	
74	07	09	AM	A	7270			80									
74	08	09	AM	A	8060		11830	70	45								
74	09	09	AM	A	7210				7				6.9	24.0		5.8	
74	09	09	PM	A			13480	35									
74	10	09	AM	A	7980	4830			22	38			6.5	24.5	865	3.1	12.37
74	10	09	PM	A	7590		13230	40								0.5	
74	11	09	AM	A	7540		12850	20	14				6.2	25.0		2.7	
74	11	09	PM	A			11720	50								2.1	
74	12	09	AM	A	7260	4600	12360	50	28	7			6.0	25.0	760	1.7	8.26
74	12	09	PM	A	6540		10370	65								0.5	
74	12	09	1030	A			12620	5									
74	13	09	AM	A	6620			70					6.0	23.0		6.6	
74	13	09	PM	A				30									
74	14	09	AM	A				70									
74	15	09	AM	A	7800		12470	70	45								
74	16	09	AM	A	7960		14050	50	63				6.9	21.0		4.2	
74	16	09	PM	A			11430	50									

REACTOR OPERATING RESULTS

YEAR	DATE DAY	MON	TIME	REACTOR	MLSS	VSS	WASTE CONC	IGAL WASTE	-----EFFLUENT--- SS	ALK	NH3N HACH	NO3N	PH	TEMP	30 MIN SET	DO	OUR
74	16	09	1600	A			11350	40									
74	27	10	AM	A	7270		13970	80	32								
74	28	10	AM	A	6180	4070			29	61			6.7	24.5	720	1.1	11.63
74	28	10	PM	A	6460		12260	40						24.5		0.1	
74	29	10	AM	A	5830								6.8	25.0		3.4	
74	29	10	PM	A				40									
74	30	10	PM	A				50									
74	31	10	AM	A	6790				30				6.8	25.0		3.1	
74	31	10	PM	A			11540	35									
74	01	11	AM	A	6770				21				6.6	24.5		4.5	
74	01	11	PM	A			11990	35									
74	02	11	AM	A	7140		20720	35	8								
74	03	11	AM	A	7390		12850	40	14								
74	04/11/74 DUE TO OPERATOR ERROR NO VSS WAS TAKEN, THEREFORE THE VSS VALUE																
74	SHOWN WAS BASED ON A VSS OF 71 PER CENT																
74	04	11	AM	A	8160	5794			30	42			7.0	24.0	900	2.4	24.95
74	04	11	PM	A	7390		13930	40						24.0		1.0	
74	14	11	PM	A			10620	20					6.1	24.0	325	5.4	
74	15	11	AM	A	6090	3960			26	3							8.95
74	14	11	AM	A	6480				44				6.2	23.5		6.6	
74	15	11	PM	A	7320		12180	20					6.2	24.0		4.7	
74	16	11	AM	A				25									
74	17	11	AM	A				35									
74	18	11	AM	A	6130				12				7.3	13.0		7.1	
74	18	11	PM	A			11620	30									
74	19	11	AM	A	5680		10620	30	5				7.3	11.0		4.0	
74	20	11	AM	A	5900		9990	30	4				7.6	11.0		4.2	
74	20	11	AM	A			10160	20									
74	21	11	AM	A	5880		10950	30	13				7.4	10.5		5.7	
74	21	11	PM	A			4600	10									
74	22	11	AM	A	5560	3790	9990	25	17	42			7.0	11.0	946	2.9	5.11
74	22	11	PM	A	5470		9220	20						11.0		2.1	
74	23	11	AM	A	5760				26								
74	26	11	AM	A	5230		9420	20	6				7.0	11.0		4.8	
74	27	11	AM	A	5310	3680	9980	8	15	19			7.0	11.0	950	3.6	4.99
74	27	11	PM	A	5160		9550	15						11.0		2.3	
74	27	11	PM	A			9510	20									
74	28	11	AM	A			9170	25									
74	28	11	PM	A				6									
74	29	11	AM	A				30									
74	30	11	AM	A				40									
74	01	12	AM	A	4800		8270	45	3								
74	02	12	AM	A	5030				9				7.3				
74	02	12	PM	A			7860	50									
74	03	12	AM	A	4590		8660	30	19								
74	03	12	PM	A			7490	30									
74	04	12	AM	A	4940		8380	35	18								
74	04	12	PM	A				25									

REACTOR OPERATING RESULTS

DATE									-----EFFLUENT---								
YEAR	DAY	MON	TIME	REACTOR	MLSS	VSS	WASTE CONC	IGAL WASTE	SS	ALK	NH3N HACH	NO3N	PH	TEMP	30 MIN SET	DO	OUR
74	05	12	AM	A										13.5		4.2	
74	05	12	PM	A				35						12.0		3.3	
74	06	12	AM	A										10.5		4.5	
74	06	12	AM	A										10.5		3.8	
74	07	12	AM	A				42									
74	08	12	AM	A	5530		9610	53	9								
74	09	12	AM	A	5410				16								
74	10	12	AM	A	4240		7720	29	17				7.1	5.0		7.7	
74	10	12	PM	A												6.1	
74	11	12	AM	A	4960		7900	30	11				7.3	5.3		7.2	
74	11	12	PM	A			8000	20									
74	12	12	AM	A	4300		7720	30	22				7.0	6.0		5.5	
74	13	12	AM	A	4650		8150	35	5				7.4	5.5		6.0	
74	14	12	AM	A	5170			42									
74	15	12	AM	A				12									
74	16	12	AM	A	5330				19					11.5		3.9	
74	16	12	PM	A			9350	30									
74	17	12	AM	A	5580		9650	35	11				7.4	10.0		6.9	
74	17	12	PM	A	3250		7090	40					7.5	10.0		5.5	
74	17	12	AM	A			8930	40									
74	17	12	AM	A			7550	65									
74	17	12	PM	A			7040	30									
74	18	12	AM	A	4160				15				7.5	10.5		6.5	
74	19	12	AM	A	4900				8				7.4	10.5		6.1	
74	20	12	AM	A	5440				15				7.2				
74	21	12	AM	A	6030			86	11								
75	14	01	AM	A	5040												
75	15	01	AM	A	4800								7.0	17.0		2.1	
75	16	01	AM	A	5000		5000	60	16				7.1	14.5		2.7	
75	16	01	PM	A			4790	30									
75	17	01	AM	A	4970		4970	60	18				7.0	14.5		4.9	
75	18	01	AM	A	4750		4750	100	10								
75	19	01	AM	A	4050		4050	100	19								
75	20	01	AM	A	3990		3990	70	25				7.0	8.5		5.9	
75	21	01	AM	A	4030		4030		30	22			6.9	9.0		4.7	
75	22	01	AM	A	3630		3630	38	32				6.8	9.5		4.4	
75	21	01	PM	A			4030	50									
75	23	01	AM	A	3820				90								
75	24	01	AM	A	3740		3740	38	23				6.9	10.5		3.7	
75	26	01	AM	A	5020		5020	70	13								
75	27	01	AM	A	3620		3620	20	8					10.5		5.3	
75	28	01	0900	A	3790	2810	3790	25	16								
75	28	01	1100	A	3400		3380	20									
75	28	01	1300	A	3380												
75	28	01	1900	A	2440												
75	28	01	2100	A	2640												
75	28	01	2300	A	2630												
75	29	01	0100	A	3760												

REACTOR OPERATING RESULTS

YEAR	DATE DAY	DATE MON	TIME	REACTOR	MLSS	VSS	WASTE CONC	IGAL WASTE	EFFLUENT SS	EFFLUENT ALK	EFFLUENT NH3N	EFFLUENT NO3N HACH	PH	TEMP	30 MIN SET	DO	OUR
75	29	01	0300	A	3920												
75	29	01	0500	A	3670												
75	29	01	0815	A	3580												
75	29	01	0900	A	3620	2710	3620	25	20								
75	29	01	1100	A	3500												
75	29	01	1300	A	3590												
75	29	01	1500	A	3630		3630	20	25								
75	29	01	1700	A	3750												
75	29	01	1900	A	3690												
75	29	01	2100	A	3780												
75	29	01	2300	A	3810												
75	30	01	0100	A	3800												
75	30	01	0300	A	3840												
75	30	01	0500	A	3810												
75	30	01	0700	A	3570												
75	30	01	0900	A	3660	2630	3660	60	18								
75	31	01	PM	A				60									
75	31	01	PM	A				40									
75	01	02	AM	A				80									
75	02	02	AM	A	4270		4270	110	5								
75	03	02	AM	A	4310		4310	60	8				7.0	10.5		3.9	
75	03	02	PM	A			4310	50									
75	04	02	AM	A	4230		4290	50	2				7.0	9.5		4.7	
75	04	02	PM	A			4290	75									
75	05	02	AM	A	4230		4230	60	16				7.2				
75	06	02	AM	A	4370		4370	50	11								
75	06	02	PM	A			4370	50									
75	07	02	AM	A	4100		4100	50	5				7.2	10.0		4.4	
75	07	02	PM	A			4100	50									
75	08	02	AM	A	4340		4340	100	12								
75	09	02	AM	A	4410		4410	120	22								
75	10	02	AM	A	4280	3050	4280	50	15	80			7.3	9.5	810	5.0	5.01
75	10	02	PM	A			5030	80									
75	10	02	PM	A										9.5		4.6	
75	11	02	AM	A	3770		3770	50	3					3.5		4.8	
75	12	02	PM	A				50									
75	21	02	AM	A	5660		9920	25	43								
75	22	02	AM	A	5390		10920	25	16					15.5		2.2	
75	23	02	AM	A	5730		10250	25	41					15.0		5.3	
75	23	02	PM	A			10250	25									
75	24	02	AM	A	6340		10460	20	54					15.0		6.4	
75	25	02	AM	A	5710				46				7.4	15.0		6.?	
75	25	02	PM	A			10610	20									
75	26	02	AM	A	5440	3510			24	16			6.8	15.0	600	4.5	5.06
75	26	02	PM	A	5590		5590	25						15.0		2.7	
75	27	02	AM	A	5580		5580	140	28								
75	28	02	AM	A	4440		4440	100	31				7.0	15.0		4.7	
75	01	03	AM	A	3370		3370	150	34								

REACTOR OPERATING RESULTS

YEAR	DATE DAY	DATE MON	TIME	REACTOR	MLSS	VSS	WASTE CONC	IGAL WASTE	EFFLUENT SS	EFFLUENT ALK	EFFLUENT NH3N	EFFLUENT NO3N HACH	PH	TEMP	30 MIN SET	DO	OUR
75	02	03	AM	A	2960		2900	210	32								
75	03	03	AM	A	2380	1680	2360	175	25	82			7.4	14.9		6.5	
75	03	03	1600	A	2340												
75	04	03	0900	A	2220	1490	2190	170	27				7.2	14.5		6.4	
75	04	03	1600	A	2160					70	4.0			10.6		6.7	
75	05	03	0900	A	2060	1350	2020	130	33	84			7.4	9.0		8.0	
75	05	03	1600	A	1980				54					9.0		6.7	
75	06	03	0830	A	2110	1400	2080	130	46	97			7.4	9.0		7.0	
75	06	03	1600	A	2050				50								
75	07	03	0900	A	2160	1500	2100	115	24	102			7.4	9.0		7.2	
75	07	03	1600	A	2030				26								
75	08	03	AM	A	1960		1360	148	36								
75	09	03	AM	A				148									
75	10	03	0930	A	1940		1940	140	78				7.3	14.5		5.7	
75	11	03	0930	A	1990	1610	2080	140	42	52	2.5		7.1	15.0		4.7	
75	11	03	1600	A	2160				33					15.0		3.4	
75	12	03	0900	A	2150	1750	2210	140	34	11	8.0			15.0		4.9	
75	12	03	1600	A	2230				27					15.0		2.9	
75	13	03	0900	A	2140	1750	2080	105	50	58				14.5		4.7	
75	13	03	1500	A	2020				170				7.7	14.5		7.8	
75	14	03	0900	A	2010	1520	2070	105	52	113			7.9	14.5		7.5	
75	14	06	1600	A	2140				60		20.0			14.5		6.3	
75	15	03	0900	A	2320	1750	2320	105	58	115			7.8	14.5		5.3	
75	16	03	0900	A	2560	1883	2560	105	33	104			7.7	14.5		5.5	
75	17	03	AM	A	2630	1900	2030	105	29	91	13.5		7.6	15.0		4.9	
75	17	03	1600	A	2870				26								
75	18	03	AM	A	3000	2140	3000	131	25	74	6.5		7.4	15.0		4.7	
75	18	03	1600	A	3250				25								
75	19	03	0900	A	2840		2840	140	33				7.5	14.5		6.1	
75	19	03	PM	A			2840	15									
75	20	03	AM	A				13									
75	20	03	PM	A				135									
75	21	03	0900	A	2600		2000	115	28				7.4	14.5		6.0	
75	22	03	0900	A	1870		1870	35									
75	22	03	AM	A				12									
75	23	03	0900	A	1530												
75	24	03	0900	A	1870	1310	1895	99	23	86	0.5		7.6	14.5		7.2	
75	24	03	PM	A	1920				24					14.5		7.9	
75	25	03	0900	A	1890	1160	2335	132	27	91			7.7	14.5		8.2	
75	25	03	1600	A	2780				44		7.3						
75	26	03	0900	A	1900	1260	1800	75	23	94	1.1		7.4	14.5		8.6	
75	26	03	1600	A	1700				16					14.5		6.5	
75	27	03	AM	A	1660	1110	1855	105	32	83			7.7	14.5		8.6	
75	27	03	1600	A	2050				26					14.5		7.7	
75	28	03	0900	A	1780	1180	1780	105									
75	28	03	PM	A				25									
75	29	03	AM	A				105									
75	30	03	AM	A				105									

REACTOR OPERATING RESULTS

DATE YEAR	DAY	MON	TIME	REACTOR	MLSS	VSS	WASTE CONC	IGAL WASTE	-----EFFLUENT--- SS	ALK	NH3N NO3N HACH	PH	TEMP	30 MIN SET	DO	OUR
75	31	03	AM	A				114								
75	01	04	AM	A				114								
75	02	04	AM	A				132								
75	03	04	0900	A	2500		2500	132	20			7.5	16.0		6.1	
75	04	04	0900	A	2720		2720	160	14			7.6	15.0		5.7	
75	05	04	AM	A				160								
75	06	04	AM	A	1820		1820	132								
75	07	04	0900	A	1960	1530	1955	107	21	84	0.4	7.6	15.0		7.2	
75	07	04	1600	A	1950				24				15.0		6.2	
75	08	04	0900	A	2080	1540	2040	133	30	101	29.0	7.6	14.5		6.1	
75	08	04	1600	A	2010				26				14.5		5.3	
75	09	04	0900	A	2370	1800	2690	150	11	85	0.3	7.4	14.5		7.5	
75	09	04	1600	A	3010				7				14.6		5.9	
75	10	04	0900	A	2410	1780	2330	148	20	79	0.7	7.4	14.5		7.4	
75	10	04	1600	A	2250				15				14.5		5.5	
75	11	04	0900	A	2440	1750	2440	148				7.5	14.5		7.6	
75	12	04	AM	A				138								
75	13	04	AM	A				128								
75	14	04	0900	A	1440		1440	44				7.4	12.7		7.1	
75	15	04	0900	A	2040	1550	2080	143	15	156		7.4	14.0		4.1	
75	15	04	1615	A	2120				19				13.8		5.8	
75	16	04	0845	A	2580	1940	2940	168	37	188		7.1	11.0		5.3	
75	16	04	1630	A	3300				35				11.5		6.0	
75	17	04	0900	A	2870	2110	2670	157	18	159		7.2	12.5		4.5	
75	17	04	1600	A	2460				29				12.0		5.2	
75	18	04	0900	A	2690	2050	2630	148	29	153		7.1	13.0		6.5	
75	18	04	1600	A	2600				15				13.0		5.9	
75	19	04	0830	A	2740	1920	2750	128	29	149		7.2	12.5		5.7	
75	19	04	1430	A	2770				21				12.5		3.7	
75	20	04	0900	A	2510	1810	2470	153	16	163		6.8	13.4		6.9	
75	20	04	1300	A	2420				34				12.5		6.5	
75	21	04	0845	A	2760	2030	2800	128	25	176		7.1	12.2		4.7	
75	21	04	1630	A	2840				16				12.5		5.7	
75	22	04	0830	A	2480	1820	2430	128	18	193		7.1	14.0		4.4	
75	22	04	1600	A	2380				24				12.5		4.6	
75	23	04	0900	A	2840	2090	2990	146	25	151		7.2	13.5		3.9	
75	23	04	1600	A	3140				18				13.0		4.1	
75	24	04	0900	A	2910	2060	2860	128	36	171		7.2	12.0		5.0	
75	24	04	1600	A	2810				38				12.0		6.3	
75	25	04	0900	A	2990	2190	2990	128	37			7.1	12.5		3.5	
75	26	04	AM	A				160								
75	27	04	AM	A				160								
75	28	04	AM	A				128								
75	29	04	AM	A				150								
75	30	04	AM	A				160								
75	01	05	0900	A	2900		2900	160	21			7.3	23.5		4.7	
75	02	05	AM	A	4190		4190	128	39				23.5		4.8	
75	03	05	AM	A				128								

REACTOR OPERATING RESULTS

DATE YEAR	DAY	MON	TIME	REACTOR	MLSS	VSS	WASTE CONC	IGAL WASTE	EFFLUENT SS	ALK	NH3N HACH	NO3N	PH	TEMP	30 MIN SET	DO	OUR
75	04	05	AM	A	3090		3090	128	28								
75	05	05	AM	A	3070	2160	3425	128	34	56			7.1	23.5	320	4.3	11.93
75	05	05	PM	A	3780				32					25.0		3.5	
75	09	05	AM	A	2380		2380	160	16				7.3	13.5		6.[illegible]	
75	09	05	PM	A				20									
75	10	05	AM	A				160									
75	11	05	AM	A	2020		2020	160	12								
75	11	05	PM	A			2020	20									

75 12/05/75 DUE TO OPERATOR ERROR NO VSS WAS TAKEN, THEREFORE THE VSS VALUE
75 SHOWN,IS BASED ON 13/05/75 VSS (81 PER CENT)

REACTOR OPERATING RESULTS

YEAR	DATE DAY	DATE MON	TIME	REACTOR	MLSS	VSS	WASTE CONC	IGAL WASTE	EFFLUENT SS	EFFLUENT ALK	RETURN SLUDGE	PH	TEMP	30 MIN SET	DO	OUR
75	12	05	AM	A	1970	1536	1900	160	14	179		7.2	12.5		[illegible]	
75	12	05	PM	A	1830				4		3820		13.0		3.7	
75	13	05	AM	A	1700	1330	1750	128	14	204		7.1	12.2		4.4	
75	13	05	AM	A							4130					
75	13	05	PM	A	1800				32		3290		12.4		4.6	
75	14	05	AM	A	2240	1780			41	190	4600	7.2	12.5		4.2	
75	14	05	PM	A	2350		2300	146	39				12.8		5.2	
75	14	05	PM	A							4360					
75	15	05	AM	A	3030	2220	3010	160	33	180		7.2	12.5		5.6	
75	15	05	AM	A							5500					
75	15	05	PM	A	2990				32		5600		12.5		3.1	
75	16	05	AM	A	3210	2360	3210	129	30							
75	16	05	AM	A							5600					
75	17	05	AM	A				128								
75	18	05	AM	A				128								
[illegible]	19	05	AM	A				128								
75	19	05	PM	A				20								
75	20	05	AM	A				128								
75	21	05	AM	A				[illegible]								
75	22	05	AM	A				160								
75	23	05	AM	A	2700		2700	160	16							
75	24	05	AM	A				160								
75	25	05	AM	A	1800		1800	138	24							
75	26/05/75 DUE TO OPERATOR ERROR NO VSS WAS TAKEN, THEREFORE THE VSS VALUE															
75	SHOWN,IS BASED ON 27/05/75 VSS (31 PER CENT)															
75	26	05	AM	A	1680	1361	1085	128	33	140		7.3	12.0		7.9	
75	26	05	AM	A							3070					
75	26	05	PM	A	1690				20		2680		12.5		6.5	
75	27	05	AM	A	1670	1360	1635	138	35	82		7.3	12.5		4.9	
75	27	05	[illegible]	A							3200					
75	27	05	PM	A	1600				28		2840		11.7		3.3	
75	28	05	AM	A	1820	1450	1835	144	53	168		7.3	12.7		5.4	
75	28	05	AM	A							3330					
75	28	05	PM	A	1850				41		3370		12.2		3.1	
75	29	05	AM	A	2030	1620	2010	160	51	169		7.1	12.7		5.0	
75	29	05	PM	A	1990				30		3080		12.0		1.3	
75	29	05	AM	A							4070					
75	30	05	AM	A	2130	1610	2130	160	28							
75	31	05	AM	A				160								
75	01	06	AM	A	1540		1540	160	33							
75	02	06	AM	A	1520	1200	1440	128	40	135		7.4	12.7		4.9	
75	02	06	AM	A							1890					
75	02	06	PM	A	1360				31		2670		12.5		3.1	
75	03	06	AM	A							2560					
75	03	06	AM	A	1450	1170	1440	128	31	243		7.4	13.5		2.0	
75	03	06	PM	A	1430				38		2430		12.5		2.6	
75	04	06	AM	A	1560	1270	1560	129	43	197		7.6	12.5		8.0	
75	04	06	AM	A							2630					

REACTOR OPERATING RESULTS

YEAR	DATE DAY	DATE MON	TIME	REACTOR	MLSS	VSS	WASTE CONC	IGAL WASTE	EFFLUENT SS	EFFLUENT ALK	RETURN SLUDGE	PH	TEMP	30 MIN SET	DO	OUR
75	04	06	PM	A	1560				25		2060		12.7		7.8	
75	05	06	AM	A	1720	1250	1615	128	45	156		7.4	12.5		8.0	
75	05	06	AM	A							2220					
75	05	06	PM	A	1510				34		2160		12.9		7.8	
75	06	06	AM	A	1500	1190	1500	64	38			7.3	12.8		7.9	
75	07	06	AM	A							2570					
75	12	06	AM	A	4060				37		6960	7.3	18.0		6.4	
75	13	06	AM	A	4330		8820	33	17			7.2	17.6		6.2	
75	14	06	AM	A				29								
75	15	06	AM	A				29								
75	16	06	AM	A	4670		6910	26	29			7.2	17.0		6.9	
75	16	06	PM	A			6910	16								
75	17	06	AM	A	4950		6480	26	20			7.4	18.3		6.6	
75	18	06	AM	A	5050		7600	24	29			7.2	18.5		5.5	
75	26	06	AM	A	1710		2020	99	18			7.6	12.2		7.8	
75	27	06	AM	A	1950		2550	104	22			7.2	14.2		6.4	
75	28	06	AM	A				108								
75	29	06	AM	A				108								
75	30	06	AM	A	1300		1720	123	22			7.3	21.0		6.6	
75	01/07/75 DUE TO OPERATOR ERROR NO VSS WAS TAKEN, THEREFORE THE VSS VALUE															
75	SHOWN, IS BASED ON 02/07/75 VSS (80 PER CENT)															
75	01	07	AM	A	1160	928	1120	128	22	141	2740	7.3	21.0		6.1	
75	01	07	PM	A	1260				42		2140		21.0		5.[illegible]	
75	02	07	AM	A	1320	1050	1820	68	28	164	2220	7.3	21.0		5.[illegible]	
75	02	07	PM	A	2250		3520	54	41		3080		20.8		4.9	
75	03	07	AM	A	1650	1340	1500	128	34	149	2770	7.5	21.8		5.0	
75	03	07	PM	A	1480				14		3270		21.0		5.5	
75	02	07	PM	A			2250	6					21.2		6.[illegible]	
75	04	07	AM	A	1020											

REACTOR OPERATING RESULTS

DATE YEAR	DAY	MON	TIME	REACTOR	MLSS	VSS	WASTE CONC	IGAL WASTE	-----EFFLUENT--- SS	ALK	NH3N HACH	NO3N	PH	TEMP	30 MIN SET	DO	OUR
73	22	11	AM	A1	5390								7.3	5.5		3.2	
73	23	11	AM	A1	5550								7.3	5.5		3.2	
73	24	11	AM	A1	4600												
73	25	11	AM	A1	6030												
73	26	11	AM	A1	5580								7.2	5.5		5.8	
73	27	11	AM	A1	5380	3900							7.4	5.5	410	6.6	3.20
73	27	11	PM	A1	5150	3690											
73	28	11	AM	A1	6400								7.4	6.0		5.6	
73	29	11	AM	A1	5410	3920							7.4	5.5	315	7.3	1.66
73	29	11	PM	A1	5020	3650											
73	29	11	AM	A1	5215	3785							7.4	5.5	315	7.3	1.68
73	30	11	AM	A1	5540								7.4	5.5		7.4	
74	06	02	AM	A1									7.5	9.3		1.4	
74	07	02	AM	A1	7610								7.5	10.3		4.6	
74	08	02	AM	A1	5320								7.4	10.5		6.1	
74	09	02	PM	A1	4270									10.0		3.5	
74	10	02	AM	A1	6910									10.0		4.5	
74	11	02	AM	A1	4820	3400							7.4	3.3	595	3.4	5.10
74	11	02	PM	A1	5890	4130											
74	12	02	AM	A1	3370								7.4	10.0		3.5	
74	13	02	AM	A1	5760	4020							7.7	3.5	380	3.6	4.77
74	14	02	PM	A1	4810								7.4	9.8		5.7	4.03
74	15	02	AM	A1	4460								7.1	10.0		2.6	
74	16	02	AM	A1	3960									10.0		4.3	
74	17	02	AM	A1										10.0		4.9	
74	18	02	AM	A1									7.7	10.0		4.7	
74	19	02	AM	A1	3500	2570							8.2	7.3		5.3	
74	19	02	PM	A1	3960									10.0		4.5	
74	20	02	AM	A1	5720								7.4	10.5		4.3	
74	21	02	AM	A1	4370	3070							7.6	10.0	350	4.5	3.36
74	21	02	PM	A1	4300												
74	22	02	AM	A1	7080								7.2	15.0		[illegible]	
74	23	02	AM	A1	7410									14.8		4.5	
74	24	02	AM	A1	[illegible]									14.5		[illegible]	
74	25	02	AM	A1	5150								7.4	14.8		3.8	
74	26	02	AM	A1	4860								7.5	15.0		3.5	
74	27	02	AM	A1	5160	3370							7.1	14.3		4.2	7.54
74	27	02	PM	A1	5450												
74	28	02	AM	A1	4660								7.2	15.5		1.8	
74	01	03	AM	A1	5000	3370							7.3	14.5	340	5.5	5.72
74	02	03	AM	A1	5790									15.0		5.5	
74	03	03	AM	A1	4110								7.3	14.5		5.5	
74	04	03	AM	A1	4060	2760							7.4				
74	04	03	PM	A1	4840												
74	05	03	AM	A1	4830								7.5	5.3		8.9	
74	06	03	AM	A1	4510	1518							7.7	5.0		6.7	
74	07	03	AM	A1	4000								7.5	5.3		7.7	
74	08	03	AM	A1	4490	3080							7.7	4.5		[illegible]	

REACTOR OPERATING RESULTS

YEAR	DATE DAY	DATE MON	TIME	REACTOR	MLSS	VSS	WASTE CONC	IGAL WASTE	EFFLUENT SS	EFFLUENT ALK	EFFLUENT NH3N	EFFLUENT NO3N HACH	PH	TEMP	30 MIN SET	DO	OUR
74	09	03	AM	A1	3850								7.5	5.0		7.3	
74	10	03	AM	A1	4490									4.5		7.9	
74	11	03	AM	A1	3880								7.4	5.0		6.9	
74	12	03	AM	A1	4630								7.6	10.3		3.5	
74	13	03	AM	A1	4240								7.6	10.3		3.3	
74	14	03	AM	A1	5500								7.4	9.8		3.6	
74	15	03	AM	A1	6330	4270							7.7	9.3		4.3	3.12
74	15	03	PM	A1	5220												
74	16	03	AM	A1	4440								7.6	9.5		8.4	
74	17	03	AM	A1	3170												
74	18	03	AM	A1	3290								7.7	10.0		8.6	
74	19	03	AM	A1	3550								7.7	7.8		9.8	
74	20	03	AM	A1	4940								7.5	9.0		9.3	
74	21	03	AM	A1	4820								7.8	9.8		7.3	
74	22	03	AM	A1	5520								7.2	11.5		8.0	
74	23	03	AM	A1	7070									10.0		8.3	
74	24	03	AM	A1	5490									11.5		8.8	
74	25	03	AM	A1	6550	4910							7.9	9.5		8.4	3.35
74	25	03	PM	A1	5970												
74	27	03	AM	A1	6340								7.6	11.8		8.1	
74	28	03	AM	A1	6410								7.5	10.8		8.5	
74	29	03	AM	A1	6250								7.6	5.0		10.9	
74	30	03	AM	A1	6810									5.0		10.1	
74	31	03	AM	A1	4460												
74	01	04	AM	A1	7290								7.5	11.0		5.5	
74	02	04	AM	A1	5160								7.3	9.5		3.9	
74	03	04	AM	A1	5510	3960							7.4	9.8		2.8	4.16
74	03	04	PM	A1	6450												
74	04	04	AM	A1	7700								7.4	9.5		2.5	
74	05	04	AM	A1	6730	4480							7.4	9.0		4.0	3.20
74	05	04	PM	A1	6570												
74	06	04	AM	A1	7500									13.5		2.9	
74	07	04	PM	A1	5280												
74	08	04	AM	A1	5430								7.3	14.5		2.8	
74	09	04	0900	A1	7550	4990											
74	09	04	1200	A1	5690												
74	09	04	1500	A1	5710	3750											
74	09	04	1800	A1	4770												
74	09	04	2100	A1	5030												
74	09	04	AM	A1									7.5	14.5		2.5	3.30
74	10	04	0900	A1	5050	3410											
74	10	04	1200	A1	6070												
74	10	04	1500	A1	5420	3720											
74	10	04	1800	A1	5230												
74	10	04	2100	A1	4590												
74	10	04	AM	A1									7.2	14.8		4.1	3.05
74	11	04	AM	A1	6670												
74	12	04	AM	A1	4510												

REACTOR OPERATING RESULTS

YEAR	DATE DAY	DATE MON	TIME	REACTOR	MLSS	VSS	WASTE CONC	IGAL WASTE	EFFLUENT SS	EFFLUENT ALK	EFFLUENT NH3N	EFFLUENT NO3N HACH	PH	TEMP	30 MIN SET	DO	OUR
74	13	04	AM	A1	6040												
74	14	04	AM	A1	5440												
74	15	04	AM	A1	5300												
74	16	04	AM	A1	6100	4300							7.2	5.0		2.7	3.25
74	16	04	PM	A1	6030												
74	17	04	AM	A1	6410								7.3	5.0		3.2	
74	18	04	AM	A1	7010	4870											2.22
74	18	04	PM	A1	6040												
74	19	05	AM	A1	4500												
74	20	05	AM	A1	5000								7.3	5.0		5.2	
74	21	05	AM	A1	4210	2790							7.2	5.5	370	4.7	1.32
74	21	05	PM	A1	4520												
74	22	05	AM	A1									7.3	5.3		4.8	
74	23	05	AM	A1	4730	3330							7.3	5.5	325	4.2	2.24
74	23	05	PM	A1	4390												
74	24	05	AM	A1	5490								7.4	6.0		4.6	
74	15	06	PM	A1	5460												
74	17	06	AM	A1	6470								6.8	9.5		2.6	
74	18	06	AM	A1	6160	4400							7.0	9.5	750	4.2	3.93
74	18	06	PM	A1	5720												
74	19	06	AM	A1	5910								7.1	10.0		3.6	
74	20	06	AM	A1	6120	4290							7.0	9.0	880	3.7	3.74
74	20	06	PM	A1	5920												
74	21	06	AM	A1	5870								6.8	11.0		2.1	
74	23	06	PM	A1	7430												
74	24	06	AM	A1	8060								6.9	16.0		4.8	
74	25	06	AM	A1	7730								7.0	17.0		3.7	
74	26	06	AM	A1	6400	4450							6.6	15.0	950	3.7	2.56
74	26	06	PM	A1	6470												
74	27	06	AM	A1	5720								6.6	16.0		4.6	
74	28	06	AM	A1	6640	4690							7.1	16.0	895	2.1	6.02
74	28	06	PM	A1	6980									15.0			
74	29	06	AM	A1	5970												
74	08	07	PM	A1	5910									6.0			
74	13	07	PM	A1	5770												
74	09	07	AM	A1	5060								7.1	6.0		4.6	
74	10	07	AM	A1	5490	3940							7.3	6.0		4.8	3.13
74	10	07	PM	A1	5640									6.5		1.8	
74	11	07	AM	A1	5870								7.2	6.0		1.4	
74	12	07	AM	A1	6260	4440							7.0	5.5	830	2.3	2.27
74	13	07	AM	A1	6230												
74	20	07	AM	A1	6000												
74	21	07	AM	A1	4570												
74	22	07	AM	A1	5290	3770							6.9	13.0	350		6.09
74	22	07	PM	A1	5790												
74	23	07	AM	A1	6090												
74	25	07	AM	A1	7280								7.1	20.0		3.4	
74	26	07	AM	A1	6400								7.0	20.5		3.1	

REACTOR OPERATING RESULTS

YEAR	DATE DAY	DATE MON	TIME	REACTOR	MLSS	VSS	WASTE CONC	IGAL WASTE	EFFLUENT SS	EFFLUENT ALK	EFFLUENT NH3N	EFFLUENT NO3N HACH	PH	TEMP	30 MIN SET	DO	OUR
74	27	07	AM	A1	6260												
74	28	07	AM	A1	5380												
74	29	07	AM	A1	6240								7.1	20.0		1.9	
74	30	07	AM	A1	5850	4160							6.7	21.0	850	2.7	4.06
74	31	07	AM	A1	6040								6.5	20.0		3.2	
74	01	08	AM	A1	9110								6.4				
74	02	08	AM	A1	7720								7.2	20.5		4.2	
74	03	08	AM	A1	6430												
74	04	08	AM	A1	6800												
74	05	08	AM	A1	7150												
74	06	08	AM	A1	6890	4720							6.7	20.0	920	2.1	4.24
74	06	08	PM	A1	6890									70.0		2.1	
74	07	08	AM	A1	6920								6.6	20.5		3.2	
74	08	08	AM	A1	6850	4450							6.9	21.0	925	4.0	9.97
74	08	08	PM	A1	7370									21.0		1.8	
74	09	08	AM	A1	7680								6.9	20.5		5.7	
74	17	09	AM	A1	7040	4440							6.9	20.0	700	3.2	8.32
74	17	09	PM	A1	5640												
74	18	09	AM	A1	5660								6.6	20.0		1.8	
74	18	09	PM													2.1	
74	19	09	AM	A1	6030	4040							6.5	20.0	760	3.0	3.65
74	19	09	PM	A1	6100											2.1	
74	20	09	AM	A1	5910								6.5	22.5		4.1	
74	22	09	AM	A1	7110												
74	22	09	AM	A1	7580												
74	24	09	AM	A1	6150								6.6	20.0		5.5	
74	25	09	AM	A1	5940	3980							6.5	21.0	700	4.5	3.67
74	25	09	PM	A1	5230									20.0		2.4	
74	26	09	AM	A1	6010								6.7	19.5		4.3	
74	27	09	AM	A1	5760	3890							6.0	19.5	490	4.3	11.12
74	27	09	PM	A1	5570									20.0		3.0	
74	28	09	AM	A1	5950												
74	30	09	AM	A1	5940								6.9	9.0		4.2	
74	13	10	AM	A1	6650												
74	14	10	AM	A1	6200									20.5		2.1	
74	15	10	AM	A1	5930								7.1	20.5		2.4	
74	16	10	AM	A1	6130								7.2	20.0		1.7	
74	16	10	PM	A1	6250												
74	17	10	AM	A1	6290								7.0	20.5		2.4	
74	18	10	AM	A1	5920	3890							6.6	20.5	700	2.3	10.66
74	18	10	PM	A1	5970									20.0		1.9	
74	20	10	AM	A1	5940												
74	22	10	AM	A1	5900								7.1	24.0		5.3	
74	23	10	AM	A1	7190								7.0	25.5		3.3	
74	24	10	AM	A1	6730								6.8	25.0		3.5	
74	25/10/74 DUE TO OPERATOR ERROR NO VSS WAS TAKEN, THEREFORE THE VSS VALUE																
74	SHOWN WAS BASED ON A VSS OF 64 PER CENT																
74	25	10	AM	A1	7200	4608							7.1	25.0	870	[illegible]	12.20

REACTOR OPERATING RESULTS

YEAR	DATE DAY	DATE MON	TIME	REACTOR	MLSS	VSS	WASTE CONC	IGAL WASTE	EFFLUENT SS	EFFLUENT ALK	EFFLUENT NH3N	EFFLUENT NO3N HACH	PH	TEMP	30 MIN SET	DO	OUR
74	25	10	PM	A1	6570									25.0		0.2	
74	26	10	AM	A1	6600								7.0	25.0		0.9	
74	05	11	AM	A1	7940				14				7.2	24.5		6.9	
74	05	11	PM	A1	7460		13950	40									
74	06	11	AM	A1	7900								7.1	23.5	940	1.0	22.79
74	06	11	PM	A1	7370									24.0		1.6	
74	07	11	AM	A1	7720								7.1	24.5		5.0	
74	10	11	AM	A1	7660												
74	11	11	AM	A1	7150									24.0		2.5	
74	12	11	AM	A1	6890								7.3	25.0		5.5	
74	13	11	PM	A1	6700	4510							7.0	24.5	920	3.7	16.58
74	13	11	PM	A1	6570									24.5		1.8	
74	24	11	AM	A1	5550												
74	25	11	AM	A1	6000	4070							7.0	11.0	960	4.0	5.76
74	25	11	PM	A1	5450												
75	13	02	AM	A1	5690								8.1	8.6		5.7	
75	14	02	AM	A1	5590								6.5	9.0		5.0	
75	15	02	AM	A1	5900												
75	16	02	AM	A1	5820												
75	17	02	AM	A1	5970								7.2	9.0		4.5	
75	18	02	AM	A1	6210								7.1	9.0		5.4	
75	19	02	AM	A1	5570								7.2	9.0		3.8	
75	20	02	AM	A1	5820	4120							7.2	9.0	900	5.3	4.67
75	20	02	PM	A1	5680									9.0		4.8	
75	21	02	AM	A1	5750												
75	06	05	AM	A1	3400		3400	128	14				6.6	25.0		4.4	
75	07	05	AM	A1	3580								6.5	24.5	260	2.1	19.57
75	07	05	PM	A1	2990									25.5		1.3	
75	08	05	AM	A1	3200								6.6	24.5		3.8	
75	19	06	AM	A1	4980		8150	14	40				7.0	19.0		6.4	
75	20	06	AM	A1	5400	3460							6.4	19.0	590	2.2	10.77
75	20	06	PM	A1	5520									13.5		3.1	
73	22	11	AM	A2	5650				117				7.3	6.0		4.1	
73	23	11	AM	A2	6660				116				7.3	5.5		7.1	
73	24	11	AM	A2	4580				40								
73	25	11	AM	A2	5710		9800	41	60								
73	26	11	ASSUME	EA	SUSPENDED	SOLIDS =		50	MG/L	BASED	ON	AVERAGE		DAILY		VALUE	
73	26	11	AM	A2	4760				50		6		7.3	5.5		8.6	
73	27	11	ASSUME	EA	SUSPENDED	SOLIDS =		70	MG/L	BASED	ON	AVERAGE		DAILY		VALUE	
73	27	11	AM	A2	5380	3875	11220	60	70	199			7.4	5.0	625	8.7	2.90
73	28	11	ASSUME	EA	SUSPENDED	SOLIDS =		50	MG/L	BASED	ON	AVERAGE		DAILY		VALUE	
73	28	11	AM	A2	6280		11070	58	50				7.4	6.0		9.2	
73	27	11	PM	A2	5240	3760											
73	29	11	AM	A2	5360	3840			45				7.4	5.5	315	8.8	1.60
73	29	11	PM	A2	4860	3500											
73	30	11	AM	A2	4990				129				7.4	5.5		8.9	
74	23	01	AM	A2			10450	26									
74	06	02	AM	A2			10340	15	42				7.5	9.3		2.0	

REACTOR OPERATING RESULTS

DATE YEAR	DAY	MON	TIME	REACTOR	MLSS	VSS	WASTE CONC	IGAL WASTE	-----EFFLUENT--- SS	ALK	NH3N	NO3N HACH	PH	TEMP	30 MIN SET	DO	OUR
74	07	02	AM	A2	5950		9820	22					7.5	10.3		5.8	
74	08	02	AM	A2	5410		9956	51	32		2	14	7.5	10.3		4.6	
74	08	02	PM	A2			9980	23									
74	09	02	PM	A2	4830		8670	61	21					10.0		6.1	
74	10	02	AM	A2	7750		8900	22	44					10.0		6.1	
74	11	02	AM	A2	5130	3640	11200	24	36	140			7.4	9.5	550	6.3	4.70
74	11	02	PM	A2	5550	3960	9580	26									
74	12	02	AM	A2	5200		8950	56	89				7.4	10.3		6.1	
74	13	02	AM	A2	5180	3630	10020	35	122				7.8	9.5	560	6.2	4.90
74	13	02	PM	A2	5840		9800	18									
74	14	02	PM	A2	4910		9670	70	846				7.4	10.0		3.5	3.56
74	15	02	AM	A2	4980		9280	54	+999				7.1	10.5		4.8	
74	15	02	PM	A2			8970	19									
74	16	02	AM	A2	5080		8380	89	81					10.3		4.2	
74	17	02	AM	A2	5000		8260	110	88					11.0		5.0	
74	18	02	AM	A2	4970		8620	77	127				7.6	10.0		4.1	
74	18	02	PM	A2			7330	50									
74	19	02	AM	A2	4170	3020	7500	64	57	143			8.1	6.0		5.8	
74	19	02	PM	A2	3830		6470	40						9.5		4.4	
74	20	02	AM	A2	4980				39				7.5	10.8		4.3	
74	20	02	PM	A2			7810	40									
74	21	02	AM	A2	4690	3380	7860	45	23	100			7.7	10.3	355	4.0	3.18
74	21	02	PM	A2	5060		7220	30									
74	22	02	AM	A2	4960		8390	40	33				7.2	15.0		2.6	
74	22	02	PM	A2			7950	40									
74	23	02	AM	A2	6000		9640	51	31					15.0		4.2	
74	24	02	AM	A2	6540		9250	42	52					14.8		4.1	
74	24	02	PM	A2			7720	28									
74	25	02	AM	A2	4990		7430	40	38				7.5	14.5		3.8	
74	26	02	AM	A2	4880		7640	50	38				7.5	14.8		3.9	
74	27	02	AM	A2	4770	3100			31	77			7.2	14.5	345	2.0	6.69
74	27	02	PM	A2	5550		7190	50									
74	28	02	AM	A2	4700				15				7.2	15.5		5.8	
74	28	02	PM	A2			7370	50									
74	01	03	AM	A2	4730	3140			20	53			7.4	14.8		6.1	8.00
74	01	03	PM	A2			5910	50									
74	02	03	AM	A2	5810		6330	50	19					15.0		6.1	
74	03	03	AM	A2	4130				16				7.4	14.5		7.8	
74	03	03	PM	A2			6600	50									
74	04	03	AM	A2	3690	2430			51				7.5				
74	04	03	PM	A2	4560		7990	35									
74	05	03	AM	A2	4900				54				7.6	5.5		9.2	
74	05	03	PM	A2			10430	60									
74	06	03	AM	A2	5150	1480			57				7.9	5.0		10.[illegible]	
74	07	03	AM	A2	4320				66				7.6	5.5		8.4	
74	07	03	PM	A2			7100	40	43								
74	08	03	AM	A2	5360	3560			51				7.7	4.8		8.9	
74	08	03	PM	A2			6220	50									

REACTOR OPERATING RESULTS

YEAR	DATE DAY	DATE MON	TIME	REACTOR	MLSS	VSS	WASTE CONC	IGAL WASTE	EFFLUENT SS	EFFLUENT ALK	EFFLUENT NH3N	EFFLUENT NO3N HACH	PH	TEMP	30 MIN SET	DO	CUR
74	09	03	AM	A2	3500		6840	40	40				7.5	5.5		7.2	
74	10	03	AM	A2	4440		5940	49	36					5.0		8.3	
74	11	03	AM	A2	3430				33				7.4	5.5		6.4	
74	11	03	PM	A2			6910	40									
74	12	03	AM	A2	4960				33				7.5	10.3		3.7	
74	12	03	PM	A2			6700	50			12						
74	13	03	AM	A2	5790				24				7.6	10.3		3.6	
74	13	03	PM	A2			7250	40									
74	14	03	AM	A2	6530				42		15	7	7.4	9.8		3.9	
74	14	03	PM	A2			9100	70									
74	15	03	AM	A2	5680	3880			45				7.8	9.3	215	4.7	3.02
74	15	03	PM	A2	6020		6310	49									
74	16	03	AM	A2	4680				65				7.6	9.5		10.0	
74	16	03	PM	A2			5390	80									
74	17	03	AM	A2	3570		2640	60	74								
74	18	03	AM	A2	3160		4320	50	63				7.7	10.0		9.5	
74	19	03	AM	A2	4590				53				7.8	8.0		9.5	
74	19	03	PM	A2			4040	60									
74	20	03	AM	A2	4590				51				7.6	10.3		6.5	
74	20	03	PM	A2			6020	67									
74	21	03	AM	A2	5440		7020	74	44		18	6	7.8	10.0		9.3	
74	22	03	AM	A2	5810				39				7.2	11.5		7.0	
74	22	03	PM	A2			15770	45									
74	23	03	AM	A2	6560		11450	60	170					10.8		6.9	
74	24	03	AM	A2	4830		8190	60	35					11.8		6.8	
74	25	03	AM	A2	5800	4310	7570	30	73	129			7.7	9.8	280	6.9	2.95
74	25	03	PM	A2	6670		8200	30									
74	27	03	AM	A2	6210				50				7.6	12.3		7.1	
74	27	03	PM	A2			10370	20									
74	28	03	AM	A2	5590				63				7.5	11.3		7.7	
74	28	03	PM	A2			6536	20									
74	29	03	AM	A2	5810				30				7.6	5.5		10.1	
74	29	03	PM	A2			6750	30									
74	30	03	AM	A2	6440		6290	30	48					5.5		7.6	
74	31	03	AM	A2	4550				31								
74	31	03	PM	A2			6040	21									
74	01	04	AM	A2	6710				26				7.4	11.3		3.9	
74	01	04	PM	A2			6800	35									
74	02	04	AM	A2	5140				29				7.3	10.0		2.7	
74	02	04	PM	A2			5860	40									
74	03	04	AM	A2	5400	3800	10850	15	51	127			7.5	10.[illegible]	540	2.5	4.21
74	03	04	PM	A2	5630		9360	5									
74	04	04	AM	A2	6990		9270	15					7.4	9.6		4.0	
74	04	04	PM	A2			10870	14									
74	05	04	AM	A2	6300	4130	10520	14	20	100			7.5	9.5	445	7.1	3.44
74	05	04	PM	A2	6630		9820	10									
74	06	04	AM	A2	8530				34					12.5		4.4	
74	06	04	PM	A2			12840	35									

REACTOR OPERATING RESULTS

YEAR	DATE DAY	DATE MON	TIME	REACTOR	MLSS	VSS	WASTE CONC	IGAL WASTE	EFFLUENT SS	EFFLUENT ALK	EFFLUENT NH3N	EFFLUENT NO3N HACH	PH	TEMP	30 MIN SET	DC	DUR
74	07	04	PM	A2	5010		11270	35	74								
74	08	04	AM	A2	5190	8950	14	19					7.5	14.8		6.4	
74	09	04	0900	A2	6670	4410	11350	10									
74	09	04	1200	A2	4930		10660										
74	09	04	1500	A2	4780	3060	11340										
74	09	04	1720	A2			7020	20									
74	09	04	1800	A2	4840		9900										
74	09	04	2100	A2	4770		10610										
74	09	04	AM	A2					22	76			7.6	14.8	405	4.4	5.78
74	10	04	0900	A2	5410	3580	11510										
74	10	04	1200	A2	5240		11540										
74	10	04	1500	A2	5270	3400	11280										
74	10	04	1800	A2	5080		11570										
74	10	04	1820	A2			9320	25									
74	10	04	2100	A2	4460		11260										
74	10	04	AM	A2					33	35			7.1	14.8		4.1	6.84
74	11	04	AM	A2	5660		11430	30									
74	12	04	AM	A2	4440				7								
74	12	04	PM	A2			10770	20									
74	13	04	AM	A2	4450		10930	20	4								
74	14	04	AM	A2	5450		9140	15	49								
74	15	04	AM	A2	5090		10760	10	46								
74	16	04	AM	A2	5550	3860			17	99			7.4	5.3	655	3.9	2.86
74	16	04	PM	A2	5670		10180	18									
74	17	04	AM	A2	6000								7.4	5.5		6.4	
74	17	04	PM	A2			10190	27									
74	18	04	AM	A2	7130	4930			15	107			7.2	5.0	800	4.1	3.15
74	18	04	PM	A2	5630		13780	36									
74	19	05	AM	A2	4680		9000	35	68								
74	20	05	AM	A2	5020				22				7.3	5.3		7.8	
74	20	05	PM	A2			8290	35									
74	21	05	AM	A2	4140	2750			22	185			7.3	5.5	380	6.1	2.67
74	21	05	PM	A2	4400		8270	30									
74	22	05	AM	A2					55				7.2	5.5		6.4	
74	22	05	PM	A2			8460	40									
74	23	05	AM	A2	4920	3280			22	195			7.4	5.5	330	6.1	1.87
74	23	05	PM	A2	5980		10980	30									
74	24	05	AM	A2	4840			90	22				7.3	6.0		4.6	
74	16	06	PM	A2	5870		9810	30	10								
74	17	06	AM	A2	7490				10				6.9	10.0		5.2	
74	17	06	1330	A2			10260	10									
74	17	06	1530	A2			9920	11									
74	17	06	1700	A2			11030	21									
74	18	06	AM	A2	5960	4300	9930	20	14				7.0	10.0	850	5.4	3.41
74	18	06	PM	A2	5630		10370	31									
74	19	06	AM	A2	5510		3190	21	18				6.9	10.0		5.5	
74	19	06	PM	A2			10390	14									
74	20	06	AM	A2	5930	4130			15	39			6.9	9.[illegible]	885	5.4	[illegible].36

REACTOR OPERATING RESULTS

YEAR	DATE DAY	DATE MON	TIME	REACTOR	MLSS	VSS	WASTE CONC	IGAL WASTE	EFFLUENT SS	EFFLUENT ALK	EFFLUENT NH3N	EFFLUENT NO3N HAC1	PH	TEMP	30 MIN SET	DO	OUR
74	20	06	PM	A2	5840		10130	25									
74	21	05	AM	A2	6200		9840	21					6.9	10.0		5.3	
74	23	06	PM	A2	7270		12390	40	17								
74	24	06	AM	A2	7650				13				7.0	16.0		6.3	
74	24	06	PM	A2			7780	40									
74	25	06	AM	A2	7530				9				7.2	17.5		5.6	
74	25	06	PM	A2			6510	50									
74	25	06	PM	A2			13210	20									
74	26	06	AM	A2	7150	4940	13390	20	12	5			6.5	15.0	910	6.2	1.91
74	26	06	PM	A2	6360		10100	37									
74	26	06	PM	A2			8460	11									
74	27	06	AM	A2	6430		6350	25	5				6.4	16.0		7.1	
74	27	06	PM	A2			6980	20									
74	28	06	AM	A2	6380	4470			26	40			7.1	17.0	850	4.2	4.49
74	28	06	PM	A2	6610		7330	40						16.0			
74	29	06	AM	A2	5560			52	5								
74	08	07	AM	A2	6080		6260	20	56				6.7	6.0		5.3	
74	08	07	PM	A2			9040	36									
74	09	07	AM	A2	5790		9670	19	6				7.1	6.5		5.5	
74	09	07	PM	A2			5600	40									
74	10	07	AM	A2	5100	3690			10	83			7.4	6.0		6.1	1.98
74	10	07	PM	A2	5500									5.0		4.4	
74	11	07	AM	A2	6390				8				7.2	6.0		3.8	
74	11	07	PM	A2			9790	40									
74	12	07	AM	A2	6550	4670			19	81			7.0	6.0	800	3.4	2.05
74	12	07	PM	A2	6330		9090	50									
74	13	07	AM	A2	6240			90									
74	20	07	AM	A2	5940		9830	50	15								
74	21	07	AM	A2	5580		9540	65									
74	22	07	AM	A2	5180	3790	9930	30	14	52			6.9	13.0	330		4.95
74	22	07	PM	A2	5370												
74	23	07	AM	A2	5430			30									
74	24	07	PM	A2				40									
74	25	07	AM	A2	7340				73				7.1	20.0		6.5	
74	25	07	AM	A2			9900	45									
74	25	07	AM	A2			9450	3									
74	26	07	AM	A2	6560		13670	9	33				7.1	21.0		1.9	
74	26	07	1100	A2			12540	40									
74	27	07	AM	A2	6170		8580	45	24								
74	28	07	AM	A2	5740		8480	45	13								
74	29	07	AM	A2	5810				12				7.1	20.5		5.7	
74	30	07	AM	A2	6166	4450			7	6			6.3	20.5	810	3.6	5.06
74	30	07	PM	A2			9650	35									
74	31	07	AM	A2	5900				100				6.2	20.0		5.8	
74	31	07	PM	A2			10050	35									
74	01	08	AM	A2	8560		12240	60	25				6.2				
74	01	08	PM	A2			11230	58									
74	02	08	AM	A2	7800				15				7.2	20.5		7.5	

REACTOR OPERATING RESULTS

YEAR	DATE DAY	DATE MON	TIME	REACTOR	MLSS	VSS	WASTE CONC	IGAL WASTE	EFFLUENT SS	EFFLUENT ALK	EFFLUENT NH3N	EFFLUENT NO3N HACH	PH	TEMP	30 MIN SET	DO	DUR
74	07	04	PM	A2	5010		11270	35	24								
74	08	04	AM	A2	5190	8950	14	19					7.5	14.8		6.4	
74	09	04	0900	A2	6670	4410	11350	10									
74	09	04	1200	A2	4930		10660										
74	09	04	1500	A2	4780	3060	11340										
74	09	04	1720	A2			7020	20									
74	09	04	1800	A2	4840		9900										
74	09	04	2100	A2	4770		10610										
74	09	04	AM	A2					22	76			7.6	14.8	405	4.4	5.78
74	10	04	0900	A2	5410	3580	11510										
74	10	04	1200	A2	5240		11540										
74	10	04	1500	A2	5270	3400	11280										
74	10	04	1300	A2	5080		11570										
74	10	04	1820	A2			9320	25									
74	10	04	2100	A2	4460		11260										
74	10	04	AM	A2					33	35			7.1	14.8		4.1	6.84
74	11	04	AM	A2	5660		11430	30									
74	12	04	AM	A2	4440				7								
74	12	04	PM	A2			10770	20									
74	13	04	AM	A2	4450		10930	20	4								
74	14	04	AM	A2	5450		9140	15	49								
74	15	04	AM	A2	5090		10760	10	46								
74	16	04	AM	A2	5550	3860			17	99			7.4	5.3	655	3.9	2.86
74	16	04	PM	A2	5670		10180	18									
74	17	04	AM	A2	6000								7.4	5.5		6.4	
74	17	04	PM	A2			10190	27									
74	18	04	AM	A2	7130	4930			15	107			7.2	5.3	800	4.1	3.15
74	18	04	PM	A2	5630		13780	36									
74	19	05	AM	A2	4680		9000	35	68								
74	20	05	AM	A2	5020				22				7.3	5.3		7.8	
74	20	05	PM	A2			8290	35									
74	21	05	AM	A2	4140	2750			22	185			7.3	5.5	380	6.1	2.67
74	21	05	PM	A2	4400		8270	30									
74	22	05	AM	A2					55				7.3	5.5		6.4	
74	22	05	PM	A2			8460	40									
74	23	05	AM	A2	4920	3280			22	195			7.4	5.5	330	6.1	1.87
74	23	05	PM	A2	5980		10980	30									
74	24	05	AM	A2	4840			90	22				7.3	6.0		4.6	
74	16	06	PM	A2	5870		9810	30	10								
74	17	06	AM	A2	7490				10				5.9	10.0		5.2	
74	17	06	1330	A2			10260	10									
74	17	06	1530	A2			9920	11									
74	17	06	1700	A2			11030	21									
74	18	06	AM	A2	5960	4300	9930	20	14				7.0	10.0	850	5.[illegible]	3.[illegible]1
74	18	06	PM	A2	5630		10370	31									
74	19	06	AM	A2	5510		3190	21	18				6.9	10.0		5.[illegible]	[illegible]
74	19	06	PM	A2			10390	14									
74	20	06	AM	A2	5930	4130			15	39			5.9	[illegible]	885	5.[illegible]	[illegible].36

REACTOR OPERATING RESULTS

YEAR	DATE DAY	DATE MON	TIME	REACTOR	MLSS	VSS	WASTE CONC	IGAL WASTE	EFFLUENT SS	EFFLUENT ALK	EFFLUENT NH3N	EFFLUENT NO3N HACH	PH	TEMP	30 MIN SET	CC	OUR
74	02	08	PM	A2	2		6590	52									
74	03	08	AM	A2	7510		11540	35	25								
74	04	08	AM	A2	7000		12690	30									
74	05	08	AM	A2	6960		11120	40	8								
74	06	08	AM	A2	7050	4780			56	10			6.8	20.0	920	3.6	4.04
74	06	08	PM	A2	6900		9100	25						20.0		4.8	
74	07	08	AM	A2	6720		13180	20	100				6.4	20.5		5.6	
74	07	08	PM	A2			12770	30									
74	08	08	AM	A2	7180	4720	12280	35	116	12			6.3	21.0	920	4.8	5.83
74	08	08	1900	A2			11300	20									
74	08	08	PM	A2	6810		13590	20						21.0		5.6	
74	09	08	AM	A2	7730			40					6.6	20.5		6.6	
74	09	08	PM	A2				30									
74	17	09	AM	A2	7340	4690	10740	50	18	21			6.9	20.5	670	3.9	7.41
74	17	09	PM	A2	5390		10620	50									
74	17	09	1645	A2			10040	50									
74	18	09	AM	A2	5550				13				6.6	20.0		3.7	
74	18	09	PM	A2			10070	70									
74	19	09	AM	A2	5850	3960			17	21			6.4	20.0	720	3.9	8.89
74	19	09	PM	A2	5880		9890	50								2.9	
74	20	09	AM	A2	5650			50					6.4	22.0		4.9	
74	20	09	PM	A2				25									
74	21	09	AM	A2				35									
74	22	09	AM	A2	7050		12480	62	19								
74	22	09	AM	A2	7530		13610	40	24								
74	23	09	PM	A2			12680	40									
74	24	09	AM	A2	5980		11910	30	45				6.5	19.5		6.0	
74	24	09	AM	A2	11480	35											
74	24	09	PM	A2	10800	30											
74	25	09	AM	A2	5640	3800	11170	30	14	22			6.4	21.0	520	5.1	3.11
74	25	09	PM	A2	5560		9190	55						20.0		3.8	
74	26	09	AM	A2	5710		11590	35	34				6.6	19.5		5.5	
74	26	09	PM	A2			10160	45									
74	27	09	AM	A2	5950	4030	10940	35	14	26			6.1	19.5	350	6.0	6.49
74	27	09	PM	A2			9680	50									
74	27	09	PM	A2	5330		9770	40						20.0		4.4	
74	28	09	AM	A2	5810			80									
74	29	09	PM	A2				50									
74	30	09	AM	A2	5770								6.9	9.0		6.3	
74	30	09	PM	A2				80									
74	13	10	AM	A2	6010		10890	70	15								
74	14	10	AM	A2	5120		9440	70	13					20.5		4.4	
74	15	10	AM	A2	4700				24				7.1	20.5		4.7	
74	15	10	PM	A2			11390	50									
74	16	10	AM	A2	7170		12580	30	12				7.2	20.0		3.1	
74	16	10	AM	A2			11610	35									
74	16	10	PM	A2	6240		12220	40									
74	17	10	AM	A2	5260		12520	35	18				7.1	20.5		4.5	

REACTOR OPERATING RESULTS

YEAR	DATE DAY	DATE MON	TIME	REACTOR	MLSS	VSS	WASTE CONC	IGAL WASTE	EFFLUENT SS	EFFLUENT ALK	EFFLUENT NH3N	EFFLUENT NO3N HACH	PH	TEMP	30 MIN SET	DO	OUR
74	17	10	PM	A2			11580	30									
74	18	10	AM	A2	5880	3830	12030	35	56	62			6.6	20.0	740	2.2	12.25
74	18	10	PM	A2	5970		10790	40						20.0		3.2	
74	19	10	AM	A2				75									
74	20	10	AM	A2	6020		10060	70	31								
74	21	10	AM	A2				53									
74	21	10	PM	A2				80									
74	21	10	PM	A2				70									
74	22	10	AM	A2	5850		10220	50	22				7.2	23.5		5.9	
74	23	10	AM	A2	6050				15				7.1	25.0		6.3	
74	23	10	PM	A2			12610	80									
74	24	10	AM	A2	6690		12550	50	31				7.0	24.5		6.5	
74	25	10	AM	A2	7000	4480	14140	35	28	77			7.1	25.0	820	3.5	6.52
74	25	10	PM	A2	7590		13320	35						24.5		1.0	
74	26	10	AM	A2	6570			75					7.0				
74	05	11	AM	A2	7940												
74	05	11	PM	A2	7460												
74	06	11	AM	A2	7750	4880			49	10			7.0	23.0	930	6.0	2.30
74	06	11	PM	A2	7580		12180	45						24.5		6.0	
74	07	11	AM	A2	7570			30					7.1	24.0		7.2	
74	08	11	AM	A2				35									
74	09	11	AM	A2				35									
74	10	11	AM	A2	7100		10900	35	30								
74	11	11	AM	A2	7010		10140	40	33					25.0		4.9	
74	12	11	AM	A2	6350				48				7.4	24.5		6.8	
74	12	11	PM	A2			11560	35									
74	13	11	PM	A2	6400	4310			29	13			6.8	24.0	870	4.8	12.07
74	13	11	PM	A2	6690		11760	20						24.5		3.6	
74	24	11	AM	A2	5640		7650	35	9								
74	25	11	AM	A2	5830	3960	10170	20	8	24			6.9	11.0	955	3.6	5.29
74	25	11	PM	A2	5510		9320	20						12.0		2.8	
74	25	11	AM	A2			8810	7						11.5		1.2	
74	25	11	PM	A2			2910	30									
75	13	02	AM	A2	5470		5540	50	136				8.1	9.0		6.3	
75	14	02	AM	A2	5570		5610	50	44				6.7	3.0		5.0	
75	15	02	AM	A2	5710		5800	30	13								
75	16	02	AM	A2	5860		5840	30	13								
75	17	02	AM	A2	6020		5970	70	5				7.1	9.0		5.0	
75	18	02	AM	A2	5720		5730	40	20				7.2	9.5		6.0	
75	19	02	AM	A2	5730		5680	40	20				7.2	9.0		4.4	
75	20	02	AM	A2	5630	3910	5820	40	27	57			8.0	9.0	910	5.3	4.15
75	20	02	PM	A2	5930									9.0		4.3	
75	07	05	AM	A2	3180		3285	160	27	27			6.4	24.5	280	4.7	6.75
75	06	05	AM	A2	3400												
75	07	05	PM	A2	2950				32					24.5		3.3	
75	07	05	MLVSS ASSUMED , A1=2310 A2=2158 B1=1577 B2=0.633 MG/L														
75	08	05	AM	A2	3020		3020	160	48				6.6	24.3		7.0	
75	19	06	AM	A2	4980												

REACTOR OPERATING RESULTS

DATE YEAR	DAY	MON	TIME	REACTOR	MLSS	VSS	WASTE CONC	IGAL WASTE	----EFFLUENT---- SS	ALK	NH3N HACH	NO3N	PH	TEMP	30 MIN SET	DO	OUR
75	20	06	AM	A2	5390	3450	3330	29	22	30			6.4	19.0	508	3.5	7.68
75	20	06	PM	A2	5430		5430	4	16					18.5		3.3	
75	21	06	AM	A2				80									
75	21	06	PM	A2				40									
73	09	11	0900	B1	6230	3950	20030	40	133				7.3	5.5	220	9.1	
73	09	11	1500	B1	5550	3460											
73	10	11	AM	B1	4240	3110											
73	11	11	1100	B1	6380	4380	16770	44	47								
73	13	11	AM	B1	6230	4110			59				7.4	13.5	280	5.0	
73	14	11	AM	B1	5400	3730	16550	40	57				7.3	5.0	220	9.4	
73	15	11	AM	B1	5750	4095	11680	44	81	189			7.4	5.0	205	8.4	1.56
73	16	11	AM	B1	7430		16670	44	63				7.5	4.5	165	11.6	
73	17	11	AM	B1	4090				37								
73	18	11	1145	B1	5580				53								
73	19	11	ASSUME EB1 SUSPENDED SOLIDS = 60 MG/L BASED ON AVERAGE DAILY VALUE														
73	19	11	AM	B1	5330	3740			55	214			7.4	*.5	235	9.6	2.22
73	19	11	PM	B1	4980	3530											
73	20	11	ASSUME EB1 SUSPENDED SOLIDS = 55 MG/L BASED ON AVERAGE DAILY VALUE														
73	20	11	AM	B1	4900		14900	58	60				7.4	4.5		9.3	
73	21	11	AM	B1	4080		12990	44	69				7.4	4.5	205	10.6	
73	22	11	AM	B1	4160				52				7.4	5.5		8.6	
73	23	11	AM	B1	4060				57				7.3	5.5		6.4	
73	24	11	AM	B1	3950				23								
73	25	11	AM	B1	4540		9980	45	32								
73	26	11	AM	B1	3830				58				7.4	6.0		6.8	
73	27	11	AM	B1	4270	3140			41				7.3	5.5	170	6.9	2.13
73	27	11	PM	B1	4640	3400											
73	28	11	AM	B1	3970		11270	45	47				7.3	5.5		6.6	
73	29	11	AM	B1	3810	2620		45					7.3	5.3	160	6.9	
73	29	11	PM	B1	4070	2340											
73	30	11	AM	B1	4380		13470	28	55				7.4	6.5		6.[illegible]	
74	24	01	AM	B1	6970		10770	30	67				7.5	4.0		6.4	
74	25	01	AM	B1	4390		8940	10	51				7.3	4.3		5.3	
74	26	01	AM	B1	3820		7330	53									
74	27	01	AM	B1	4200		11660	25	26					4.8		5.9	
74	28	01	AM	B1	4550		9050	20	41				7.2	4.8		2.5	
74	29	01	AM	B1	5780	3840	13000	38	34				7.2	4.5	200	5.3	2.44
74	29	01	PM	B1	6310												
74	30	01	AM	B1	5930		14100	25	34				7.5	5.0		2.9	
74	31	01	0900	B1	6120	4170	12770	20									
74	31	01	1200	B1	6010												
74	31	01	1500	B1	5420	3700	12130										
74	31	01	1800	B1	5030		10290										
74	31	01	2100	B1	5180		10300										
74	31	01	AM	B1	5552		12770	20	32				7.5	4.3	290	6.5	2.86
74	31	01	PM	B1			12130	20									
74	01	02	0900	B1	5130		6740										
74	01	02	AM	B1	5130			21	38				7.3	4.3		5.1	

REACTOR OPERATING RESULTS

YEAR	DATE DAY	DATE MON	TIME	REACTOR	MLSS	VSS	WASTE CONC	IGAL WASTE	EFFLUENT SS	EFFLUENT ALK	EFFLUENT NH3N HACH	EFFLUENT NO3N	PH	TEMP	30 MIN SET	DO	OUR
74	01	02	PM	B1			10980	20									
74	02	02	AM	B1	4780		8150	30	14				7.6	4.0		2.6	
74	03	02	AM	B1	4200		6240	30	40								
74	04	02	0900	B1	4280	3150	8380										
74	04	02	1200	B1	4660		8800										
74	04	02	1500	B1	4620	3220	10440										
74	04	02	1800	B1	4190		7360										
74	04	02	2100	B1	4090		12310										
74	04	02	AM	B1	4368		10930	22	55				7.2	4.5	210	5.0	3.72
74	05	02	0900	B1	4210		10210										
74	05	02	AM	B1	3990		8850	50	32				7.2	4.5		5.1	
74	06	02	AM	B1			11480	25	35				7.6	9.5		4.0	
74	07	02	AM	B1	6220		12310	45	34				7.6	10.0		6.3	
74	08	02	AM	B1	5090		9100	30	53				7.4	10.3		6.8	
74	08	02	PM	B1			7910	58									
74	09	02	PM	B1	3700		8290	32	31					10.0		4.7	
74	10	02	AM	B1	7640				14					10.0		5.0	
74	11	02	AM	B1	4300	3170	8540	63	30				7.6	9.5	200	5.1	5.91
74	11	02	PM	B1	5050	3640	3940	27									
74	12	02	AM	B1	3780		8650	38	35				7.4	10.0		5.0	
74	13	02	AM	B1	4400	3020	10590	45	28				8.2	9.5	230	6.1	5.37
74	13	02	PM	B1	5250		9850	33									
74	14	02	PM	B1	4230		9950	70	49				7.5	10.0		4.4	3.14
74	15	02	AM	B1	5340		11640	63	412				7.3	10.0		3.5	
74	15	02	PM	B1			9840	20									
74	16	02	AM	B1	4470		8890	80	18					10.0		3.0	
74	17	02	AM	B1	4100		8580	100	49					10.0		4.0	
74	18	02	AM	B1	4040		8020	51	73				7.4	10.0		2.9	
74	18	02	PM	B1			7950	80									
74	19	02	AM	B1	3270	2470	8010	40	64				8.1	7.0		4.3	
74	19	02	PM	B1	3420									10.3		2.2	
74	20	02	AM	B1	5010				38				7.4	10.5		2.9	
74	20	02	PM	B1			9250	80									
74	21	02	AM	B1	4420	3220	8520	20	34				7.6	10.0	230	3.5	2.68
74	21	02	PM	B1	4900		7750	50									
74	22	02	AM	B1	6490		10630	40	31				7.3	15.5		2.0	
74	22	02	PM	B1			6410	60									
74	23	02	AM	B1	7110		8125	80	35					14.8		3.1	
74	24	02	AM	B1	3450		6700	80	37					15.3		3.5	
74	24	02	PM	B1			8630	20									
74	25	02	AM	B1	3490				30				7.5	14.8		3.1	
74	26	02	AM	B1	4500		11250	50	27				7.6	15.0		3.3	
74	27	02	AM	B1	5150	3780			32				7.4	14.5	235	4.2	7.14
74	27	02	PM	B1	4520		9060	40									
74	28	02	AM	B1	4880				10				7.3	15.5		3.7	
74	28	02	PM	B1			10570	30									
74	01	03	AM	B1	5020	3570			25				7.6	14.8	260	4.1	7.51
74	01	03	PM	B1			11860	30									

REACTOR OPERATING RESULTS

YEAR	DATE DAY	DATE MON	TIME	REACTOR	MLSS	VSS	WASTE CONC	IGAL WASTE	EFFLUENT SS	EFFLUENT ALK	EFFLUENT NH3N	EFFLUENT NO3N HACH	PH	TEMP	30 MIN SET	DO	OUR
74	02	03	AM	B1	7250		11110	40	47					14.8		6.6	
74	03	03	AM	B1	4560				20				7.5	15.0		4.5	
74	03	03	PM	B1			10340	30									
74	04	03	AM	B1	4490	3260			67				7.6				
74	04	03	PM	B1	6760		11340	20									
74	05	03	AM	B1	7580				49				7.5	5.0		8.9	
74	05	03	PM	B1			13610	50									
74	06	03	AM	B1	4780	1479			52				7.7	4.5		10.0	
74	07	03	AM	B1	7960								7.5	5.0		8.4	
74	08	03	AM	B1	5300	3760			70				7.6	8.0		7.9	
74	08	03	PM	B1			6180	50									
74	09	03	AM	B1	2810		5230	70	52				7.6	4.8		8.8	
74	10	03	AM	B1	2600		6820	60	146					4.5		9.8	
74	11	03	AM	B1	1240				51				7.7	5.0		9.2	
74	12	03	AM	B1	5090				76				7.6	10.3		3.5	
74	12	03	PM	B1			12010	55									
74	13	03	AM	B1	5740				33				7.7	10.3		3.5	
74	13	03	PM	B1			12270	55									
74	14	03	AM	B1	5450				33				7.5	9.5		3.1	
74	14	03	PM	B1			10380	70									
74	15	03	AM	B1	5540	4090			40				7.6	9.0	210	2.7	3.64
74	15	03	PM	B1	5530		9310	50									
74	16	03	AM	B1	3880				28				7.5	9.0		5.4	
74	16	03	PM	B1	2560		5780	30									
74	17	03	AM	B1	3036		6530	70	40								
74	18	03	AM	B1	3060		7360	60	35				7.5	10.0		5.8	
74	19	03	AM	B1	4800				41				7.7	7.0		0.8	
74	19	03	PM	B1			10630	75									
74	20	03	AM	B1	4970				36				7.4	10.0		2.5	
74	20	03	PM	B1			11500	75									
74	21	03	AM	B1	5600		10880	75	54				7.5	9.8		3.8	
74	22	03	AM	B1	6070				28				7.2	11.3		4.8	
74	22	03	PM	B1			8430	80									
74	23	03	AM	B1	5370		5020	85	22					10.3		4.4	
74	24	03	AM	B1	5610		9010	85	21					11.5		3.9	
74	25	03	AM	B1	3870	3070	8350	30	31				7.8	9.5	220	3.9	4.09
74	25	03	PM	B1	5670		7450	40									
74	27	03	AM	B1	5710				24				7.5	12.0		2.9	
74	27	03	PM	B1			7550	30									
74	28	03	AM	B1	6320				19				7.5	11.3		3.6	
74	28	03	PM	B1			7540	50									
74	29	03	AM	B1	4920				15				7.5	4.0		7.9	
74	29	03	PM	B1			11030	60									
74	30	03	AM	B1	5860		6960	65	25					4.8		9.2	
74	31	03	AM	B1	4080				14								
74	31	03	PM	B1			6370	45									
74	01	04	AM	B1	6580				31				7.5	11.5		3.9	
74	01	04	PM	B1			7100	60									

REACTOR OPERATING RESULTS

YEAR	DATE DAY	DATE MON	TIME	REACTOR	MLSS	VSS	WASTE CONC	IGAL WASTE	----EFFLUENT--- SS	ALK	NH3N	NO3N HACH	PH	TEMP	30 MIN SET	DO	OUR
74	02	04	AM	B1	4440				27				7.6	9.5		7.6	
74	02	04	PM	B1			3380	90									
74	03	04	AM	B1	5050	3510	10370	40	62				7.6	9.0	235	5.7	3.34
74	03	04	PM	B1	5140		3070	70									
74	04	04	AM	B1	4370		9440	45	30				7.7	9.0		5.4	
74	04	04	PM	B1			4280	40									
74	05	04	AM	B1	5300	3060	2820	45	18	87			7.5	9.0	140	7.3	3.80
74	05	04	PM	B1	3550		4340	60									
74	06	04	AM	B1	3630					33				13.0		5.7	
74	06	04	PM	B1			4870	120									
74	07	04	PM	B1	2920	2220	50	35									
74	08	04	AM	B1	4530		4080	90	23				7.7	14.5		5.9	
74	09	04	0900	B1	3640	2540	7080										
74	09	04	0915	B1			4790	50									
74	09	04	1200	B1	3550	6790											
74	09	04	1500	B1	3630	2510	5850										
74	09	04	1720	B1			4430	20									
74	09	04	1800	B1	2880		4620										
74	09	04	2100	B1	3900		6280										
74	09	04	AM	B1					26				7.8	14.5	160	3.7	5.93
74	10	04	0900	B1	5070	3530	7070										
74	10	04	1200	B1	4340		6070	40									
74	10	04	1500	B1	3650	2690	6860										
74	10	04	1800	B1	3860	7020											
74	10	04	1920	B1			4960	50									
74	10	04	2100	B1	2700		5790										
74	10	04	AM	B1					36				7.0	14.8	240	6.5	7.16
74	11	04	AM	B1	5830		5710	40									
74	11	04	PM	B1			4520	40									
74	12	04	AM	B1	4270				29								
74	12	04	PM	B1			2030	50									
74	13	04	AM	B1	2600		2680	50	25								
74	14	04	AM	B1	2920		2580	60	108								
74	16	04	AM	B1	2240	1740			74				7.5	5.0	130	8.2	2.09
74	16	04	PM	B1	4170		7060	24									
74	17	04	AM	B1	3990								7.7	.4.5		.85	
74	17	04	PM	B1			11628	36									
74	18	04	AM	B1	3340	2600			90				7.2	4.3	185	5.8	2.18
74	18	04	PM	B1	4650		11030	27									
74	21	04	AM	B1	3000		4670	30	18								
74	22	04	AM	B1	3070				26				7.5	10.5		6.1	
74	22	04	PM	B1			3500	36									
74	23	04	AM	B1	3820	2980			11				7.6	10.5	245	2.8	[illegible]
74	23	04	PM	B1	4610		4440	50									
74	24	04	AM	B1	3670		3650	30	18				7.5	9.5		[illegible]	
74	24	04	PM	B1			4260	70									
74	25	04	AM	B1	3170	2310	7800	40	15				7.6	9.5	140	5.8	[illegible]
74	25	04	PM	B1	2960		1760	50									

REACTOR OPERATING RESULTS

YEAR	DATE DAY	DATE MON	TIME	REACTOR	MLSS	VSS	WASTE CONC	IGAL WASTE	EFFLUENT SS	EFFLUENT ALK	EFFLUENT NH3N HACH	EFFLUENT NO3N	PH	TEMP	30 MIN SET	DO	OUR
74	28	04	PM	B1	3170		1950	75									
74	29	04	AM	B1	2340		3100	40	29				7.3	20.5		4.1	
74	29	04	PM	B1			2520	35									
74	30	04	0900	B1	2160	1350	6640	30									
74	30	04	1200	B1	1880		2710										
74	30	04	1500	B1	2940	1990	3960										
74	30	04	1620	B1			21520	6									
74	30	04	1800	B1	1970		3120										
74	30	04	2130	B1	1950		3720										
74	30	04	AM	B1					23				7.4	20.5	80	5.5	7.74
74	01	05	AM	B1			7500	80									
74	01	05	0900	B1	2770	2050	6280										
74	01	05	0930	B1			4460	20									
74	01	05	1200	B1	2980		4060										
74	01	05	1500	B1	3250	2350											
74	01	05	1730	B1			16270	1									
74	01	05	1800	B1	2370		4930										
74	01	05	2100	B1	2570		5260										
74	01	05	AM	B1					74				7.3	20.5	150	5.3	10.99
74	02	05	AM	B1	4020	2980	7490	40	34								
74	03	05	AM	B1				40						14.5		5.4	
74	04	05	AM	B1				40									
74	05	05	AM	B1				40									
74	06	05	AM	B1	3830				14				7.4	14.3		3.5	
74	06	05	PM	B1			6330	70									
74	07	05	AM	B1	5250		7320	55	35				7.4	14.5		3.6	
74	07	05	PM	B1			4270	55									
74	08	05	AM	B1	(NO MLSS TAKEN)				40								
74	08	05	PM	B1			11390	20									
74	08	05	PM	B1			18770	20									
74	09	05	AM	B1	2120		17290	20	38								
74	09	05	AM	B1			6160	20									
74	10	05	AM	B1	2060		13230	20	18				7.5	15.0		7.3	
74	10	05	PM	B1			12630	10									
74	11	05	AM	B1				22									
74	12	05	PM	B1	1950		9180	22	49								
74	13	05	AM	B1	2480				52				8.2	15.0		8.3	
74	13	05	PM	B1			31090	15									
74	14	05	AM	B1	1210	910			33				7.7	15.0	45	4.3	21.32
74	14	05	PM	B1	2510												
74	15	05	AM	B1	4080				27				7.9	14.8		6.1	
74	15	05	PM	B1			26240	17									
74	16	05	AM	B1	3430	2180			33				7.6	15.0	120	7.3	
74	16	05	PM	B1	3800		24920	20									
74	17	05	AM	B1	4840				33				7.6	6.5		4.5	
74	17	05	PM	B1			5750	35									
74	18	05	AM	B1				50									
74	19	05	AM	B1	2720		2350	50	68								

REACTOR OPERATING RESULTS

YEAR	DATE DAY	DATE MON	TIME	REACTOR	MLSS	VSS	WASTE CONC	IGAL WASTE	EFFLUENT SS	EFFLUENT ALK	EFFLUENT NH3N	EFFLUENT NO3N HACH	PH	TEMP	30 MIN SET	DO	OUR
74	20	05	AM	B1	2270				51				7.5	5.0		6.4	
74	20	05	PM	B1			1960	50									
74	21	05	AM	B1	2090	1600			64				7.6	5.0	100	9.2	2.19
74	21	05	PM	B1	2560		6170	35									
74	22	05	AM	B1					69				7.6	5.0		9.7	
74	23	05	AM	B1	3730	2920			51				7.5	5.0	160	6.1	2.10
74	23	05	PM	B1	3970		13020	5									
74	24	05	AM	B1	4870			70	55				7.4	6.5		5.9	
74	26	05	PM	B1	5170		9850	50	24								
74	27	05	AM	B1	4890		8660	34	53				7.4	6.5		4.4	
74	27	05	1330	B1			9500	42									
74	27	05	1600	B1			9640	30									
74	28	05	AM	B1				55									
74	29	05	AM	B1	5970		10940	44	86				7.1	5.0		9.5	
74	29	05	PM	B1			10730	60									
74	30	05	AM	B1	4680		10830	40	93				7.5	5.5		5.3	
74	30	05	PM	B1			9860	50									
74	31	05	AM	B1	9020		9290	30	88				7.5	6.0		5.9	
74	31	05	PM	B1			9950	50									
74	02	06	AM	B1	3460		6240	80	19								
74	03	06	AM	B1	2340		5500	40	64				7.2	6.0		5.6	
74	03	06	PM	B1			8350	20									
74	04	06	AM	B1	2940	2240	4320	20	68				7.4	5.5	165	3.9	2.34
74	04	06	PM	B1	4540		6280	50									
74	05	06	AM	B1	3460		4890	30	56				7.4	5.3		8.7	
74	05	06	PM	B1			10250	40									
74	06	06	AM	B1	3320	2500	7150	30	63				7.4	6.5	120	5.3	2.35
74	06	06	PM	B1	2680		5270	40									
74	07	06	AM	B1	4480			30					7.0	6.6		4.6	-
74	07	06	PM	B1				40									
74	08	06	AM	B1				[illegible]									
74	09	06	AM	B1			6210	70									
74	10	06	AM	B1			6110	30									
74	10	06	PM	B1	3430		10?80	10	61				7.2	10.0		4.0	
74	11	06	AM	B1	4080		7680	30	36				7.5	9.5	225	1.5	4.03
74	11	06	PM	B1	5220												
74	12	06	AM	B1					16				7.2	10.0		0.5	
74	12	06	PM	B1			8960	41									
74	13	06	AM	B1	5640				21				7.1	10.0	28	4.2	1.79
74	14	06	AM	B1	5130		8540	30					7.0	10.0		4.0	
74	13	06	PM	B1	5410	3980	10890	60					6.9	10.0		1.4	
74	14	06	PM	B1				55									
74	15	06	AM	B1				70									
74	16	06	PM	B1	3540			80	10								
74	17	06	AM	B1	3810		8690	35	12				7.1	9.5		6.9	
74	17	06	1700	B1			7470	40									
74	18	06	AM	B1	3500	2920	6940	30	31				7.2	9.0	210	5.4	3.60
74	18	06	PM	B1	3670		9930	45									

REACTOR OPERATING RESULTS

YEAR	DATE DAY	DATE MON	TIME	REACTOR	MLSS	VSS	WASTE CONC	IGAL WASTE	EFFLUENT SS	EFFLUENT ALK	EFFLUENT NH3N	EFFLUENT NO3N HACH	PH	TEMP	30 MIN SET	DO	OUR
74	19	06	AM	B1	3690		7370	35	14				7.2	3.5		[illegible]	
74	19	06	PM	B1			7300	55									
74	20	06	AM	B1	3840	2630	6600	40	5				7.2	8.5	145	5.6	2.15
74	20	06	PM	B1	2860		5530	60									
74	21	06	AM	B1	3860		7200	40					7.1	11.5		3.1	
74	21	06	PM	B1				20									
74	22	06	AM	B1				55									
74	23	06	PM	B1	6650		12480	55	9								
74	24	06	AM	B1	6630				13				6.9	16.0		3.7	
74	24	06	PM	B1			11160	55									
74	25	06	AM	B1	7090		11660	30	9				7.1	17.0		2.5	
74	25	06	PM	B1			12980	35									
74	26	06	AM	B1	6210	4300	13860	35	11				5.7	15.0	850	2.3	2.46
74	26	06	PM	B1	6970		10240	35									
74	27	06	AM	B1	5940		9890	35	8				6.8	16.0		2.9	
74	27	06	PM	B1			7760	20									
74	28	06	AM	B1	7050	5070	7550	35	25				7.5	16.0	600	2.7	4.82
74	28	06	PM	B1	6220		8320	25						14.0			
74	29	06	AM	B1	6210			30	16								
74	30	06	AM	B1				75									
74	01	07	AM	B1	4140				16								
74	01	07	PM	B1			6080	75									
74	02	07	1600	B1			5030	36									
74	02	07	2220	B1			3150	35									
74	02	07	AM	B1	4030	1360	4050	35	31				6.9	14.5	135	5.3	5.70
74	03	07	AM	B1	2650		10160	35	81				7.5	15.0		6.8	
74	03	07	PM	B1			2650	38									
74	03	07	PM	B1			3040	19									
74	04	07	AM	B1	2930		8580	35	29				7.0	13.5		7.4	
74	04	07	PM	B1			6950	35									
74	05	07	AM	B1	2950		12350	35	44				7.3	13.5	75	7.2	2.23
74	05	07	PM	B1	2710		5010	35						13.5		[illegible]	
74	06	07	AM	B1	3250			45									
74	07	07	AM	B1				45									
74	08	07	AM	B1	3290		3150	30	133				7.2	5.0		6.7	
74	08	07	PM	B1			7160	10									
74	09	07	AM	B1	1960		3330	33	79				7.3	6.0		6.3	
74	09	07	AM	B1			1000	40									
74	09	07	PM	B1	1320												
74	10	07	AM	B1	2520	1760			120				7.5	6.0		4.6	1.60
74	10	07	PM	B1	3470		8210	10						7.0		[illegible]	
74	11	07	AM	B1	3990		5600	30	79				7.4	5.5		[illegible]	
74	12	07	AM	B1	3940	3100			96				7.3	5.0	175	2.3	2.24
74	12	07	PM	B1			11840	35									
74	13	07	AM	B1	3965			70									
74	14	07	AM	B1	3370		3330	30	18								
74	15	07	AM	B1	1720				62				7.3	14.5		[illegible]	
74	15	07	PM	B1			32283	10									

REACTOR OPERATING RESULTS

YEAR	DATE DAY	DATE MON	TIME	REACTOR	MLSS	VSS	WASTE CONC	IGAL WASTE	EFFLUENT SS	EFFLUENT ALK	EFFLUENT NH3N	EFFLUENT NO3N HACH	PH	TEMP	30 MIN SET	DO	OUR
74	16	07	AM	B1	4060	2800	8180	30	46				7.4	14.0	110	4.[illegible]	3.64
74	16	07	PM	B1	3620		25240	30						14.0		2.8	
74	17	07	AM	B1	3680		5280	39	24				7.0	15.0		4.[illegible]	
74	17	07	PM	B1			10170	30									
74	18	07	AM	B1	3490	2610	20240	20	49				7.4	14.0	115	4.6	4.09
74	18	07	PM	B1	2530		19370	3[illegible]						14.5		1.8	
74	19	07	AM	B1	6560		11400	30	50				7.2	14.5		3.2	
74	19	07	1300	B1			10050	30									
74	19	07	1600	B1			9090	90									
74	20	07	AM	B1	4650		13350	50	9								
74	21	07	AM	B1	2200		4870	70									
74	22	07	AM	B1	2560	2010	11730	30	51				7.2	13.0	90		3.08
74	22	07	PM	B1	2400		4430	35									
74	23	07	AM	B1	3590			3[illegible]									
74	24	07	AM	B1			18330	40									
74	24	07	PM	B1				30									
74	25	07	AM	B1	3820		15620	40	44				7.3	20.0		4.1	
74	25	07	PM	B1			3570	30									
74	26	07	AM	B1	7570	23520	30	70					7.3	20.5		1.[illegible]	
74	27	07	AM	B1	3010		10140	70	78								
74	28	07	AM	B1	2030		12810	35	39								
74	29	07	PM	B1			4540	50									
74	29	07	AM	B1	2600		5790	30	32				7.2	20.5		4.7	
74	30	07	AM	B1	2920	2190	7820	30	23				7.4	20.0	90	5.[illegible]	4.06
74	30	07	PM	B1			3500	16									
74	31	07	AM	B1	2930	10460	39	116	116				7.3	20.0		5.[illegible]	
74	31	07	PM	B1			12770	23									
74	01	08	AM	B1	9130		13490	60	30				7.0				
74	01	08	1330	B1			9330	50									
74	01	08	1530	B1			11780	144									
74	02	08	AM	B1	5190		178[illegible]	3[illegible]	38				7.3	20.5		6.[illegible]	
74	02	08	PM	B1			6710	3[illegible]									
74	03	08	AM	B1	3350		19420	40	1	0							
74	04	08	AM	B1	4000		21390	40									
74	05	08	AM	B1	4210		126[illegible]	5[illegible]	30								
74	06	08	1330	B1			146[illegible]	30									
74	06	08	AM	B1	4280	3200	7016	30	25				7.1	20.5	245	4.7	14.84
74	06	08	PM	B1	4010		6870	30						21.5		1.[illegible]	
74	07	08	AM	B1	4630		19850	40	28				7.2	20.5		5.3	
74	07	08	PM	B1			18470	40									
74	[illegible]	08	AM	B1	6960	4220	22090	40	21				7.3	21.0	175	4.2	3.32
74	08	08	OM	B1	4950									21.0		2.[illegible]	
74	08	08	1500	B1			20310	40									
74	09	08	AM	B1	7440			50					7.2	21.0		4.2	
74	09	08	PM	B1				30									
74	10	08	AM	B1				60									
74	11	08	AM	B1	4490		9060	60	0								
74	12	08	AM	B1	3490		11270	30	13				7.2	21.0		5.7	

REACTOR OPERATING RESULTS

DATE YEAR	DAY	MON	TIME	REACTOR	MLSS	VSS	WASTE CONC	IGAL WASTE	-----EFFLUENT--- SS	ALK	NH3N	NO3N HACH	PH	TEMP	30 MIN SET	DO	OUR
74	13	08	AM	B1	4730	2800	12560	30	24				7.1	21.0	120	3.4	4.17
74	13	08	PM	B1	3480									22.0		3.1	
74	14	08	AM	B1	4530				21				6.9	22.0		3.4	
74	14	08	PM	B1			15350	30									
74	15	08	AM	B1	4266	2890	23095	30	20				7.0	19.5	100	5.5	5.87
74	15	08	PM	B1	2590									20.0		3.7	
74	16	08	AM	B1	4230			30	20				6.9	14.5		6.8	
74	17	08	AM	B1				65									
74	18	08	AM	B1	2170				43								
74	18	08	PM	B1			2970	45									
74	19	08	AM	B1	1700		6890	17	62				7.5	10.0		8.7	
74	20	08	AM	B1	2330	1810	16750	40	41				7.1	9.5	70	7.6	7.14
74	20	08	PM	B1	1770									10.5		4.[illegible]	
74	21	08	AM	B1	2990				29				7.2	9.0		5.1	
74	22	08	AM	B1	5350	3320	23070	35	30				7.1	11.5	100	6.3	3.26
74	22	08	PM	B1	2750									12.0		2.1	
74	23	08	AM	B1	4410								7.3	11.0		6.5	
74	23	08	PM	B1				40									
74	24	08	AM	B1				64									
74	25	08	AM	B1	4370		9720	56	56					4.5			
74	26	08	AM	B1	10940			40									
74	26	08	PM	B1				56									
74	26	08	PM	B1				112									
74	27	08	AM	B1	3470		6570	48	142				7.4	7.6		6.8	
74	27	08	PM	B1			5556	30									
74	28	08	AM	B1	4646		19390	45	136				7.3	5.5		10.4	
74	29	08	AM	B1	5040	3330	8650	30	98				7.4	6.0	270	6.3	
74	29	08	PM	B1	4700									6.8		4.7	
74	30	08	AM	B1	5710		11120	30					7.1	7.6		5.9	
74	30	08	2130	B1				48									
74	31	08	AM	B1				85									
74	01	09	AM	B1	7010		10230	90	11								
74	02	09	AM	B1	5980		10470	100	22								
74	03	09	AM	B1	3720		8020	40	34				6.5	25.0		3.6	
74	03	09	PM	B1			3130	30									
74	04	09	AM	B1	3000		16645	30	32				7.2	26.0		4.5	
74	05	09	AM	B1	5150		20940	30	17				7.3	2.6	0	3.9	
74	05	09	AM	B1	5600	3730	17510	30	12				5.7	25.0	310	2.8	9.82
74	06	09	PM	B1	4270		7330	25								0.1	
74	07	09	AM	B1	6570			50									
74	08	09	AM	B1	6160		13870	83	19								
74	08	09	PM	B1			6320	14									
74	09	09	AM	B1	5130		21860	35	10				7.2	25.[illegible]		2.[illegible]	
74	09	09	PM	B1			7000	10									
74	10	09	AM	B1	5850	3740	22060	45	19				7.0	25.[illegible]	180	1.[illegible]	7.73
74	10	09	PM	B1	3780		6480	10								[illegible]	
74	11	09	AM	B1	5610				19				7.[illegible]	25.[illegible]		1.[illegible]	
74	11	09	PM	B1			11180	55								[illegible]	

REACTOR OPERATING RESULTS

DATE									----EFFLUENT---								
YEAR	DAY	MON	TIME	REACTOR	MLSS	VSS	WASTE CONC	IGAL WASTE	SS	ALK	NH3N	NO3N HACH	PH	TEMP	MIN SET	DO	OUR
74	12	09	AM	31	6470	4720	11880	45	21				[illegible]	23.5	650	2.1	[illegible]
74	12	09	PM	31	6130		10840	45								[illegible]	
74	13	09	AM	31	6130			70					7.2	23.		1.	
74	14	09	AM	31				70									
74	15	09	AM	31	7890		12010	70	30								
74	16	09	AM	31	3470		13260	53	25				7.0	21.		2.	
74	16	09	PM	31			10390	70									
74	17	09	AM	31	5090	3630	12110	60	92				7.3	21.	650	4.7	[illegible]
74	17	09	PM	31	6390		10070	60									
74	18	09	AM	31	4740		9750	60	20				7.1	20.0		3.7	
74	18	09	PM	31			9420	60									
74	19	09	AM	31	5030	3570	16030	58	24				7.1	20.0	175	[illegible]	7.84
74	19	09	PM	31	3620		9170	15								1.[illegible]	
74	20	09	AM	31	4930			50					7.0	23.0		3.[illegible]	
74	20	09	PM	31				20									
74	21	09	AM	31				50									
74	22	09	AM	31	6160		21545	50	19								
74	22	09	AM	31	6770		24020	40	19								
74	23	09	PM	31			10340	40									
74	24	09	AM	31	5530		17500	35	18				7.1	20.0		2.3	
74	24	09	PM	31			10270	35									
74	25	09	AM	31	6430	4380	20470	40	84				7.1	23.5	360	5.4	[illegible]
74	25	09	PM	31	5690		9450	35						20.0		1.4	
74	26	09	AM	31	6130		17930	35	26				7.2	20.0		3.9	
74	26	09	PM	31			19230	50									
74	27	09	AM	31	5380	3770	16710	40	22				5.8	19.5	270	6.[illegible]	6.34
74	27	09	PM	31	5240		11640	50						20.0		1.9	
74	28	09	AM	31	5730			35									
74	29	09	PM	31				70									
74	30	09	AM	31			13680	50									
74	30	09	AM	31	5610		13410	30	67				7.0	7.0		3.1	
74	01	10	AM	31	5330				106				7.0	6.0		3.7	
74	01	10	PM	31			13750	50									
74	01	10	PM	31	4210		14500	30						6.1		3.4	
74	02	10	AM	31	3830		11110	30	112				7.3	5.[illegible]		[illegible]	[illegible]
74	03	10	AM	31	4630	3340	14420	30	92				7.2	6.0	190	7.9	
74	03	10	PM	31	4160									6.0			
74	04	10	AM	31	5510		14410	30					7.2	6.0		5.1	
74	04	10	PM	31			8070	40									
74	05	10	AM	31			6490	50									
74	06	10	AM	31	6310	4420		90									
74	07	10	AM	31	5350		8460	40	100				7.0	6.5		[illegible]	
74	07	10	PM	31			3950	7[illegible]									
74	08	10	AM	31	5460	3780	8430	4[illegible]	114				7.2	6.5	[illegible]	[illegible]	[illegible]
74	08	10	PM	31	4130		144[illegible]	4[illegible]						6.5		7.[illegible]	
74	09	10	AM	31	5720		12980	40	88				7.2	6.5		[illegible]	
74	09	10	PM	31			9320	4[illegible]									
74	10	10	AM	31	5110	3710	11790	40	94				7.1	7.[illegible]		8.7	[illegible]

REACTOR OPERATING RESULTS

YEAR	DATE DAY	DATE MON	TIME	REACTOR	MLSS	VSS	WASTE CONC	IGAL WASTE	EFFLUENT SS	EFFLUENT ALK	EFFLUENT NH3N	EFFLUENT NO3N HACH	PH	TEMP	30 MIN SET	DO	OUR
74	10	10	PM	B1	4310		9060	50						7.0		5.2	
74	11	10	AM	B1	5010			50					6.9				
74	11	10	PM	B1				40									
74	12	10	AM	B1				93									
74	13	10	AM	B1	6380		11820	35	12								
74	14	10	AM	B1	5530		9110	90	30					20.6		2.6	
74	15	10	AM	B1	4650				54				7.2	20.5		2.5	
74	15	10	PM	B1			13250	90									
74	16	10	AM	B1	5560		14550	30	26				7.3	20.5		2.8	
74	16	10	PM	B1	4770		16080	50						20.5		1.9	
74	17	10	AM	B1	4810		15940	30	31				7.1	20.5		3.0	
74	17	10	PM	B1			15090	35									
74	18	10	AM	B1	3950	2670	13820	30	418				2.1	20.5	180	5.2	10.61
74	18	10	PM	B1	3160		9530	45						20.5		1.4	
74	19	10	AM	B1				55									
74	20	10	AM	B1	3990		16530	55	22								
74	21	10	AM	B1				45									
74	21	10	PM	B1				87									
74	21	10	PM	B1				30									
74	22	10	AM	B1	5110		15350	30	46				7.2	24.0		5.7	
74	23	10	AM	B1	5170		17370	30	25				7.1	26.0		2.5	
74	22	10	PM	B1				35									
74	23	10	PM	B1			18160	35									
74	24	10	PM	B1			14160	40									
74	24	10	AM	B1	4610		5770	35	25				7.1	25.5		2.7	
74	25	10	AM	B1			8640	30									
74	25	10	AM	B1	4620		8810	35	30				7.5	25.5	350	2.3	13.06
74	25	10	PM	B1	4360		14110	30						25.5		1.2	
74	26	10	AM	B1	4280		8450	55					7.4	25.6		2.3	
74	27	10	AM	B1	4570		9860	30	59								
74	28	10	AM	B1	3843	2780	12700	30	28				7.3	25.5	295	2.9	15.56
74	28	10	PM	B1	3950		13330	35						24.5		3.4	
74	29	10	AM	B1	5280			35					7.1	25.0		3.1	
74	29	10	PM	B1				35									
74	30	10	PM	B1				50									
74	31	10	AM	B1	5220		14990	35	24				7.0	25.0		4.2	
74	31	10	PM	B1			14370	35									
74	01	11	AM	B1	4840		13910	35	22				6.5	25.0		3.6	
74	01	11	PM	B1			12530	35									
74	02	11	AM	B1	4480		18950	70	28								
74	03	11	AM	B1	4290		14910	70	28								
74	04	11	AM	B1	3930	2900	14860	40	30				7.4	25.0	180	4.7	18.17
74	04	11	PM	B1	2310		9500	50						25.0		2.3	
74	05	11	AM	B1	3600		13380	40	16				7.2	25.0		4.8	
74	05	11	PM	B1	2710		13780	40									
74	05/11/74 DUE TO OPERATOR ERROR NO VSS WAS TAKEN, THEREFORE THE VSS VALUE																
74	SHOWN WAS BASED ON A VSS OF 70 PER CENT																
74	06	11	AM	B1	3370	2360	16950	40	24	12			7.3	24.5	140	4.7	8.70

REACTOR OPERATING RESULTS

YEAR	DATE DAY	DATE MON	TIME	REACTOR	MLSS	VSS	WASTE CONC	IGAL WASTE	EFFLUENT SS	EFFLUENT ALK	EFFLUENT NH3N	EFFLUENT NO3N HACH	PH	TEMP	30 MIN SET	DO	OUR
74	06	11	PM	B1	2490									25.0		2.5	
74	07	11	AM	B1	3720								7.3	25.0		2.3	
74	08	11	AM	B1				56									
74	09	11	AM	B1				77									
74	10	11	AM	B1	5100		16330	70	35								
74	11	11	AM	B1	3850		4640	70	40					25.0		2.0	
74	12	11	AM	B1	2130				40				7.4	25.0		4.5	
74	12	11	PM	B1			19590	30									
74	13	11	PM	B1	2390	2210	17610	35	24				7.6	25.0	100	5.[illegible]	
74	13	11	PM	B1	1100		5570	20						25.0		3.1	
74	14	11	AM	B1	2820		5750	35	24				7.6	24.5		6.3	
74	14	11	PM	B1			15540	35									
74	15	11	AM	B1	2640	1800	12570	36	11				7.6	25.0	120	4.7	11.59
74	15	11	PM	B1	2020		15230	25					7.6	25.0		2.3	
74	16	11	AM	B1				40									
74	17	11	AM	B1				65									
74	18	11	AM	B1	3860		19370	35	44				7.3	12.5		7.9	
74	18	11	PM	B1			15980	30									
74	19	11	AM	B1	2430		3550	30	28				7.6	10.0		8.3	
74	19	11	PM	B1			16640	30									
74	20	11	AM	B1	3060		3940	35	12				7.6	10.0		6.0	
74	20	11	AM	B1			14000	30									
74	21	11	AM	B1	3330		15200	30	16				7.5	10.0		7.4	
74	21	11	PM	B1			1750	32									
74	22	11	AM	B1	2960	2060	4250	30	26				7.5	10.0	170	5.[illegible]	4.95
74	22	11	PM	B1	2840		17290	30						10.0		4.4	
74	23	11	AM	B1	3020		4350	35	58								
74	24	11	AM	B1	2400		9360	40	23								
74	25	11	AM	B1	2910	2000	16750	30	32				7.5	11.0	120	8.3	4.21
74	25	11	PM	B1	1370									12.0		2.[illegible]	
74	26	11	AM	B1	2130		15580	20	22				7.9	10.0		9.3	
74	26	11	PM	B1			15820	10									
74	27	11	AM	B1	2820	1980	4180	35	52				7.6	10.5	195	5.7	4.32
74	27	11	PM	B1	3290		16300	30						10.0		4.5	
74	28	11	AM	B1			15710	35									
74	28	11	PM	B1				84									
74	29	11	PM	B1				35									
74	30	11	AM	B1				45									
74	01	12	AM	B1	2490		13610	50	15								
74	02	12	AM	B1	2000		2460	30	50				7.2				
74	03	12	AM	B1	3050		16010	30	60								
74	03	12	PM	B1			2340	20									
74	04	12	AM	B1	5110		15750	30	18								
74	04	12	PM	B1				35									
74	05	12	AM	B1				5	0					13.5		3.8	
74	05	12	PM	B1										11.0		3.8	
74	06	12	AM	B1				30						10.0		5.[illegible]	
74	06	12	AM	B1				30						10.5		3.[illegible]	

REACTOR OPERATING RESULTS

DATE YEAR	DATE DAY	DATE MON	TIME	REACTOR	MLSS	VSS	WASTE CONC	IGAL WASTE	EFFLUENT SS	EFFLUENT ALK	EFFLUENT NH3N HACH	EFFLUENT NO3N	PH	TEMP	30 MIN SET	DO	OUR
74	07	12	AM	B1				35									
74	08	12	AM	B1	3550		21840	28	15								
74	09	12	AM	B1	2040		8610	30	21								
74	09	12	PM	B1			8710	45									
74	10	12	AM	B1	2190		11590	35	43				7.2	4.5		4.9	
74	10	12	PM	B1												3.7	
74	11	12	AM	B1	2030		8310	30	36				7.4	4.5		4.9	
74	12	12	AM	B1	1990		3630	30	66				6.6	5.0		6.7	
74	13	12	AM	B1	1830		5790	30	44				7.5	4.5		3.9	
74	14	12	AM	B1	2590			35									
74	15	12	AM	B1				35									
74	16	12	AM	B1	2960		14900	30	22					10.5		6.0	
74	16	12	PM	B1			2810	30									
74	17	12	AM	B1	3160		3970	40	22				7.5	9.5		6.5	
74	17	12	PM	B1	2390		6940	40					7.6	10.0		0.9	
74	18	12	AM	B1	4040		6310	40	15				7.5	11.0		4.7	
74	18	12	PM	B1			14820	30									
74	19	12	AM	B1	3720		13640	30	14				7.5	10.0		3.7	
74	19	12	PM	B1			3350	30									
74	19	02	PM	B1				3520	48								
74	17	12	PM	DO IN B1 INCREASED BUT NOT CHECKED AFTER													
74	20	12	AM	B1	3640		10350	30	38				7.4				
74	20	12	PM	B1			3310	30									
74	21	12	AM	B1	4150			86	21								
75	14	01	AM	B1	2340												
75	15	01	AM	B1	3030		4230	30					7.0	17.0		1.4	
75	16	01	AM	B1	3480		3930	30	29				7.3	14.0		5.4	
75	16	01	PM	B1			5660	30									
75	17	01	AM	B1	2730		2840	30	17				6.9	14.5		3.9	
75	17	01	PM	B1			5190	25									
75	18	01	AM	B1	1460		12010	20	8								
75	18	01	PM	B1			1460	54									
75	19	01	AM	B1	1690		12410	35	15								
75	19	01	PM	B1			1460	112									
75	20	01	AM	B1	2380		2380	114	31				7.1	8.5		6.0	
75	21	01	AM	B1	2590		2410	35	92				7.2	8.5		2.7	
75	22	01	AM	B1	3060		3060	50	38				7.1	9.0		2.7	
75	23	01	AM	B1	2850				27								
75	24	01	AM	B1	3120		3120	52	30				7.3	9.5		2.2	
75	25	01	AM	B1				80									
75	26	01	AM	B1	3500		3500	40	5								
75	26	01	PM	B1				80									
75	28	01	0900	B1	2280	1910	2280	35	17								
75	28	01	1100	B1	2090												
75	28	01	1300	B1	2010												
75	28	01	1900	B1	2180												
75	28	01	2100	B1	2430												
75	28	01	2300	B1	2360												

REACTOR OPERATING RESULTS

YEAR	DATE DAY	DATE MON	TIME	REACTOR	MLSS	VSS	WASTE CONC	IGAL WASTE	EFFLUENT SS	EFFLUENT ALK	EFFLUENT NH3N	EFFLUENT NO3N HACH	PH	TEMP	30 MIN SET	DO	OUR
75	29	01	AM	B1	2360		2360	140	6					9.5		5.9	
75	29	01	0100	B1	2210												
75	29	01	0300	B1	2450												
75	29	01	0500	B1	2190												
75	29	01	0815	B1	2150		3590										
75	29	01	0900	B1	2190	1800	2190	35	25								
75	29	01	1100	B1	1950												
75	29	01	1300	B1	2210												
75	29	01	1500	B1	2300		2300	57	25								
75	29	01	1700	B1	2250												
75	29	01	1900	B1	2130												
75	29	01	2100	B1	2270												
75	29	01	2300	B1	2520												
75	30	01	0100	B1	2510												
75	30	01	0300	B1	2520												
75	30	01	0500	B1	2350												
75	30	01	0700	B1	2240												
75	30	01	0900	B1	2280	1640	2280	53	17								
75	31	01	PM	B1				65									
75	31	01	PM	B1				53									
75	31	01	PM	B1				65									
75	01	02	AM	B1				112									
75	02	02	AM	B1	3830		3830	285	11				6.9	10.0		4.7	
75	03	02	AM	B1	3650		3650	180	14								
75	03	02	PM	B1	2940		2940	285									
75	04	02	AM	B1	3500		3500	158	15				7.0	9.0		7.4	
75	04	02	PM	B1	1460		1460	200									
75	04	02	PM	B1			3500	80									
75	05	02	AM	B1	2560		2560	147	90				7.5				
75	06	02	AM	B1	2960		2360	100	31								
75	06	02	PM	B1			2960	105									
75	07	02	AM	B1	3930		3930	156	34				7.2	10.0		4.8	
75	07	02	PM	B1			3930	159									
75	08	02	AM	B1	4180		3710	217	23								
75	09	02	AM	B1	3840		3840	240	15								
75	10	02	AM	B1	3850	2890	3650	151	110				7.2	9.3	380	4.2	-.02
75	10	02	PM	B1	3610		3610	106						9.0		4.8	
75	11	02	AM	B1	4250		4250	58	22					9.0		6.3	
75	11	02	AM	B1			4250	111									
75	11	02	PM	B1			4250	106									
75	12	02	AM	B1				55									
75	12	02	PM	B1				165									
75	13	02	AM	B1	3230		3230	106	224				9.1	9.0		10.1	
75	14	02	AM	B1	3310		3310	110	108				6.9	8.5		7.4	
75	14	02	PM	B1			3310	55									
75	15	02	AM	B1	3870		3870	215	30								
75	16	02	AM	B1	3450		3450	215	22								
75	17	02	AM	B1	3020		3020	98	30				7.2	8.5		6.6	

REACTOR OPERATING RESULTS

DATE YEAR	DAY	MON	TIME	REACTOR	MLSS	VSS	WASTE CONC	IGAL WASTE	-----EFFLUENT--- SS	ALK	NH3N	NO3N HACH	PH	TEMP	30 MIN SET	DO	OUR
75	18	02	AM	B1	3780		3780	96	34				7.0	8.5		6.5	
75	18	02	PM	B1			3370	48									
75	19	02	AM	B1	3520		3520	102	28				7.2	8.5		6.0	
75	20	02	AM	B1	3520	2530	3040	96	54				6.9	8.5	230	5.8	4.45
75	20	02	PM	B1	2550									8.5		4.5	
75	21	02	AM	B1	3620		5230	35	36								
75	21	02	PM	B1			4950	35									
75	21	02	PM	B1	3620		3490	40									
75	22	02	AM	B1	3490		9520	32	23					16.0		4.9	
75	23	02	AM	B1	3470		11680	27	24					14.7		4.5	
75	23	02	PM	B1			11680	27									
75	24	02	AM	B1			1650	32									
75	24	02	AM	B1	3180		13730	32	26					15.0		5.8	
75	25	02	AM	B1	2900		9300	27	33				7.6	15.0		6.9	
75	25	02	PM	B1	2070		2070	96									
75	26	02	AM	B1	2050	1440	12720	35	17				7.6	15.0	50	6.5	5.53
75	26	02	PM	B1	880									15.0		5.1	
75	27	02	AM	B1	2330		2330	240	24								
75	27	02	PM	B1													
75	28	02	AM	B1	1510		1510	240	19				7.4	15.0		1.8	
75	01	03	AM	B1	1020		1020	300	14								
75	02	03	AM	B1	920		920	300	19								
75	03	03	AM	B1	740	640	370	260	18				7.4	14.8		5.5	
75	03	03	1600	B1	1015												
75	04	03	0900	B1	990	690	1105	250	19				7.3	14.6		4.9	
75	04	03	1600	B1	1220						24.0			10.0		5.7	
75	05	03	0900	B1	1030	690	1070	260	36				7.2	8.5		6.5	
75	05	03	1600	B1	1110				46					8.5		5.4	
75	06	03	0830	B1	970	730	1010	270	44				7.8	8.5		4.9	
75	06	03	1600	B1	1050				22								
75	07	03	0900	B1	950	660	990	270	28				7.7	8.5		4.1	
75	07	03	1600	B1	1130				34								
75	08	03	AM	B1	910		910	286	40								
75	09	03	AM	B1				286									
75	10	03	0930	B1	1690		7780	30	25				7.4	14.5		4.7	
75	10	03	PM	B1			11110	16									
75	11	03	0930	B1	1460	1280	5750	25	12		27.0		7.4	15.0		2.2	
75	11	03	1600	B1	1100		5140	56	23					14.7		2.7	
75	11	03	1640	B1			1280	20						14.7		4.7	
75	12	03	1600	B1	1270		5010	69	36					14.5		6.8	
75	12	03	0900	B1	1490	1270	5320	38	20		35.0			14.5		5.5	
75	13	03	1500	B1	920		920	15	78				7.6	14.5		3.9	
75	13	03	0900	B1	1040	950	4700	72	60					14.5		8.3	
75	14	03	0900	B1	620	500	3380	43	23				7.9	14.5		6.6	
75	14	03	1600	B1	1030				66		23.0			14.5		4.3	
75	15	03	[illegible]	B1	1120	870	4900	50	54				7.0	14.5		6.0	
75	16	03	0900	B1	1280		7230	50	22				7.7	14.5		5.1	
75	17	03	AM	B1	1330	1020	6130	65	18		24.5		7.7	14.5		4.1	

REACTOR OPERATING RESULTS

YEAR	DATE DAY	DATE MON	TIME	REACTOR	MLSS	VSS	WASTE CONC	IGAL WASTE	EFFLUENT SS	EFFLUENT ALK	EFFLUENT NH3N	EFFLUENT NO3N HACH	PH	TEMP	30 MIN SET	DO	OUR
75	17	03	1600	B1	1490				28								
75	18	03	AM	B1	1240	890	4030	72	26		23.5		7.4	14.5		5.1	
75	18	03	1600	B1	1310				26								
75	18	03	1600	B1			1310	20									
75	19	03	0900	B1	920			67	31				7.5	14.5		4.9	
75	19	03	AM	B1			920	25									
75	20	03	AM	B1				63									
75	21	03	0900	B1	500		4930	29	38				7.7	14.5		7.4	
75	22	03	0900	B1	530			3									
75	23	03	AM	B1				20									
75	23	03	0900	B1	810			34									
75	24	03	0900	B1	1020	790	5060	56	22		12.2		7.8	14.5		7.4	
75	24	03	PM	B1	1100				29					14.5		7.[illegible]	
75	25	03	0900	B1	1070	720	4710	44	44				7.8	14.5		8.5	
75	25	03	1600	B1	1430		1430	15	44		15.8						
75	26	03	0900	B1	700	510	4630	26	47		15.0		7.5	14.5		9.0	
75	26	03	1600	B1	730				20					14.5		7.7	
75	27	03	AM	B1	820	590	4580	26	18				7.8	14.5		8.4	
75	27	03	PM	B1				15									
75	27	03	1600	B1	1310				15					14.5		7.5	
75	28	03	0900	B1	1230	910		36									
75	29	03	AM	B1				36									
75	30	03	AM	B1				36									
75	31	03	AM	B1				43									
75	01	04	AM	B1				43									
75	02	04	AM	B1				48									
75	03	04	PM	B1			1850	20									
75	03	04	0900	B1	1850		4260	90	17				7.6	16.0		6.7	
75	04	04	0900	B1	1650		3850	108	21				7.6	15.0		5.5	
75	05	04	AM	B1				108									
75	06	04	AM	B1	830			81									
75	07	04	0900	B1	620	560	1750	11	16				7.9	14.5		7.4	
75	07	04	1600	B1	1180				27					14.5		5.3	
75	08	04	0900	B1	1560	1220	6390	33	25				7.6	14.5		6.5	
75	08	04	1600	B1	1890				37					15.0		5.3	
75	09	04	0900	B1	1740	1390	6620	83	16				7.5	14.5		7.6	
75	09	04	1600	B1	1470				14					14.5		6.2	
75	10	04	0900	B1	1680	1300	4940	32	20				7.5	14.5		7.6	
75	10	04	1600	B1	1490		1590	25	22					14.5		6.1	
75	11	04	0900	B1	1210	920		10	8				7.5	14.[illegible]		7.[illegible]	
75	12	04	AM	B1				54									
75	13	04	AM	B1				36									
75	14	04	0900	B1	590			36					7.6	12.0		7.6	
75	15	04	0900	B1	920	770	5510	72	18				7.5	14.0		4.3	
75	15	04	1615	B1	1410		1410	25	17					13.0		5.7	
75	16	04	0845	B1	2050	1530	7520	124	36				7.2	13.5		6.2	
75	16	04	1630	B1	1960				50					11.0		5.5	
75	17	04	0900	B1	1170	940	6610	54	35				7.5	12.[illegible]		7.[illegible]	

REACTOR OPERATING RESULTS

DATE YEAR	DAY	MON	TIME	REACTOR	MLSS	VSS	WASTE CONC	IGAL WASTE	-----EFFLUENT--- SS	ALK	NH3N	NO3N HACH	PH	TEMP	30 MIN SET	DO	OUR
75	17	04	1600	B1	1150				40					11.5		6.3	
75	18	04	0900	B1	1450	1180	4920	78	20				7.3	12.0		6.3	
75	18	04	1600	B1	1030				26					11.5		7.0	
75	19	04	0830	B1	1600	1160	7000	89	28				7.6	12.0		7.6	
75	19	04	1430	B1	1400				22					11.5		7.7	
75	20	04	0300	B1	1060	820			24	166			7.1	14.0		7.8	
75	20	04	1300	B1	960				30					10.5		7.7	
75	21	04	0845	B1	1750	1420	6660	78	23				7.0	11.5		2.1	
75	21	04	1630	B1	1870				28					10.5		5.3	
75	22	04	0830	B1	1270	973	6000	68	21				7.5	13.5		6.6	
75	22	04	1600	B1	1080				35					11.0		6.7	
75	23	04	0900	B1	2110	1540	5300	93	25				7.4	12.5		4.9	
75	23	04	1600	B1	1850				22					11.5		4.6	
75	24	04	0900	B1	1240	860	4030	73	68				7.4	11.5		5.8	
75	24	04	1600	B1	1150				74					11.0		6.8	
75	25	04	0900	B1	1650	1250	5550	108	52				7.3	11.5		3.2	
75	26	04	AM	B1				360									
75	27	04	AM	B1				288									
75	28	04	AM	B1				30									
75	29	04	AM	B1				90									
75	30	04	AM	B1				126									
75	01	05	0900	B1	2280		5370	99	30				7.3	24.0		2.6	
75	02	05	PM	B1			3370	20									
75	02	05	AM	B1	3370		5310	194	19					24.5		1.2	
75	03	05	AM	B1				126									
75	03	05	PM	B1				20									
75	04	05	AM	B1	1180			110	33								
75	05	05	AM	B1	770	560	4380	48	37				7.7	24.5	60	6.6	17.14
75	05	05	PM	B1	2240				43					26.5		3.5	
75	06	05	AM	B1	3350		4210	126	30				7.5	25.9		2.0	
75	06	05	PM	B1			3350	20									
75	07	05	AM	B1	2340	1577	4350	126	23				7.5	25.2		4.2	15.21
75	07	05	PM	B1	2000		2170	20	29					25.0		1.8	
75	08	05	AM	B1	2210		4040	54	25				7.5	25.2		3.5	
75	09	05	AM	B1	2140		8000	36	22				7.4	12.5		6.1	
75	10	05	AM	B1				36									
75	11	05	AM	B1	2850		6110	40	14								
75	11	05	PM	B1			1360	20									

REACTOR OPERATING RESULTS

YEAR	DATE DAY	DATE MON	TIME	REACTOR	MLSS	VSS	WASTE CONC	IGAL WASTE	EFFLUENT SS	EFFLUENT ALK	RETURN SLUDGE	PH	TEMP	30 MIN SET	DO	OUR
75	12	05	AM	B1	1430	1158	5660	66	22			7.5	12.0		5.5	
75	12	05	ASSUME MLVSS 81 PER CENT													
75	12	05	PM	B1	1270				9		5300		11.7		3.2	
75	13	05	AM	B1							3860					
75	13	05	PM	B1	890				48		4040		12.2		3.2	
75	13	05	AM	B1	780	630	3950	83	17			7.5	12.5		4.8	
75	14	05	AM	B1	1190	850			45		3940	7.5	11.9		4.6	
75	14	05	PM	B1	1270		4130	100	74				12.0		5.4	
75	14	05	PM	B1							4310					
75	15	05	AM	B1	2130	1540	6240	137	27			7.4	12.0		4.2	
75	15	05	AM	B1							7550					
75	15	05	PM	B1	1670				58		4930		12.0		2.3	
75	16	05	AM	B1	1400	1000	4610	72	44							
75	17	05	AM	B1				61								
75	18	05	AM	B1				61								
75	19	05	AM	B1				72								
75	20	05	AM	B1				79								
75	21	05	AM	B1				86								
75	22	05	AM	B1				65								
75	23	05	AM	B1	910		3800	61	37							
75	24	05	AM	B1				61								
75	25	05	AM	B1	630			72	29							
75	26	05	AM	B1	740	550	2120	72	34			7.7	11.6		6.0	
75	26	05	ASSUME MLVSS 74 PER CENT													
75	26	05	PM	B1	710				39		4560		12.0		6.3	
75	27	05	AM	B1	590	540	2510	70	40			7.6	11.7		3.8	
75	27	05	AM	B1							5700					
75	27	05	AM	B1							1560					
75	27	05	PM	B1	520				59		3570		13.0		4.3	
75	28	05	AM	B1	690	600	2950	48	47			7.6	12.0		7.2	
75	28	05	AM	B1							2720					
75	28	05	PM	B1	700				46		1110		11.5		4.9	
75	29	05	AM	B1	1300	1040	5620	84	46			7.2	11.7		3.4	
75	29	05	AM	B1							7620					
75	29	05	PM	B1	1290				42		6590		12.0		1.3	
75	30	05	AM	B1	1150	890	4210	126	54							
75	31	05	AM	B1				126								
75	01	06	AM	B1	510			76	22							
75	02	06	AM	B1	520	410	2220	47	41			7.7	12.4		5.7	
75	02	06	AM	B1							2750					
75	02	06	PM	B1	910				40		3420		12.0		5.4	
75	03	06	AM	B1	590	473	3020	54	35			7.7	12.3		5.7	
75	03	06	AM	B1							4750					
75	03	06	PM	B1	680				52		3330		11.7		1.1	
75	04	06	AM	B1	770	615	2340	54	45			7.8	11.8		9.2	
75	04	06	AM	B1							2340					
75	04	06	PM	B1	830				43		2410		11.9		9.2	
75	05	06	AM	B1							2480					

REACTOR OPERATING RESULTS

YEAR	DATE DAY	DATE MON	TIME	REACTOR	MLSS	VSS	WASTE CONC	IGAL WASTE	EFFLUENT SS	EFFLUENT ALK	RETURN SLUDGE	PH	TEMP	30 MIN SET	DO	OUR
75	05	06	AM	B1	790	600	3905	54	39			7.9	11.9		9.5	
75	05	06	PM	B1	760				43		2300		11.9		9.2	
75	06	06	AM	B1	650	570	2210	50	38			7.8	12.0		9.3	
75	12	06	AM	B1							2250					
75	12	06	AM	B1	800		1750	198	32			7.8	17.5		8.3	
75	13	06	AM	B1	870		1390	207	28			7.7	17.6		7.9	
75	13	06	AM	B1							770					
75	14	06	AM	B1				207								
75	15	06	AM	B1				207								
75	16	06	AM	B1	1290		5820	20	28			7.5	17.3		7.7	
75	16	06	AM	B1							3710					
75	16	06	PM	B1			3710	201								
75	17	06	AM	B1	760		3560	210	20			8.1	18.4		7.3	
75	17	06	PM	B1			4190	25								
75	18	06	AM	B1	1370		2250	195	29			7.6	19.0		1.9	
75	18	06	PM	B1			6820	18								
75	19	06	AM	B1	1260		1600	204	21			7.2	19.3		6.4	
75	19	06	PM	B1			5140	30								
75	20	06	AM	B1	1040	770	1800	168	32			7.4	19.4	55	6.3	12.60
75	20	06	PM	B1	1580				31				18.0		2.9	
75	26	06	AM	B1	1410							7.9	12.0		7.5	

REACTOR OPERATING RESULTS

YEAR	DATE DAY	DATE MON	TIME	REACTOR	MLSS	VSS	WASTE CONC	IGAL WASTE	EFFLUENT SS	EFFLUENT ALK	EFFLUENT NH3N	EFFLUENT NO3N HACH	PH	TEMP	30 MIN SET	DO	OUR
73	09	11	0900	B2	7680	4720			93				7.5	6.5	935	9.9	
73	09	11	1500	B2	7810	4570											
73	10	11	AM	B2	6020	4170	16940	57	106								
73	11	11	1100	B2	6750	4180	13560	57	93								
73	13	11	AM	B2	6460	4050			77				7.4	13.0	760	7.6	
73	14	11	AM	B2	6710	4290			43		27		7.2	6.0	715	9.4	
73	15	11	AM	B2	6390	4180			56	179	12		7.3	7.0	900	8.5	2.19
73	16	11	AM	B2	6150				64		5		7.2	5.5	895	11.5	
73	17	11	AM	B2	5070				54								
73	18	11	1145	B2	7590				72								
73	19	11	AM	B2	6030	3960			91	196	8		7.2	6.0	750	9.7	1.98
73	19	11	PM	B2	6290	4000											
73	20	11	AM	B2	6610				56				7.4	6.0		9.4	
73	21	11	AM	B2	5810				55				7.3	6.0	545	9.3	
73	22	11	AM	B2	6000				25				7.3	6.5		8.1	
73	23	11	AM	B2	4520								7.2	7.0		7.1	
73	24	11	AM	B2	4420												
73	25	11	AM	B2	5420												
73	26	11	AM	B2	5110						6	6	7.3	7.0		6.4	
73	27	11	AM	B2	5510	3450							7.3	7.5	350	5.6	2.80
73	27	11	PM	B2	5040	3480											
73	28	11	AM	B2	6840								7.3	7.5		5.4	
73	29	11	AM	B2	5290	3690							7.3	7.0	630	5.6	2.13
73	29	11	PM	B2	5150	3620											
73	30	11	AM	B2	5550								7.3	8.0		5.3	
74	24	01	AM	B2	5190				41				7.5	5.5		4.7	
74	25	01	AM	B2	4420		7550		18		8	6	7.4	5.5		3.3	
74	27	01	AM	B2	4660				25					5.8		3.4	
74	28	01	AM	B2	5320		7850	20	27		5	3	7.1	6.5		3.4	
74	29	01	AM	B2	5130	3650	8000	10	43	165			7.2	6.3	315	5.2	1.87
74	29	01	PM	B2	4310												
74	30	01	AM	B2	5100		7520	8	37				7.5	5.8		3.8	
74	31	01	0900	B2	4930	3500	7020										
74	31	01	1200	B2	4340		6430	15									
74	31	01	1500	B2	4820	3520	6280										
74	31	01	1800	B2	3390		6660										
74	31	01	2100	B2	3400		6830										
74	31	01	AM	B2	4156		6430	15	42	158			7.5	6.0	250	5.1	2.63
74	01	02	0900	B2	3410		6890										
74	01	02	AM	B2	3410		7010	10	32				7.4	6.0		8.3	
74	02	02	AM	B2	3010		9570	15	42				7.4	5.5		2.5	
74	03	02	AM	B2	2850				42								
74	04	02	0900	B2	2910	2280	5430										
74	04	02	1200	B2	3500		6390										
74	04	02	1500	B2	2960	7090	4620										
74	04	02	1800	B2	2970		4680										
74	04	02	2100	B2	2940		6280										
74	04	02	AM	B2	3355				42	122			7.3	5.8	200	6.3	3.87

REACTOR OPERATING RESULTS

YEAR	DATE DAY	DATE MON	TIME	REACTOR	MLSS	VSS	WASTE CONC	IGAL WASTE	EFFLUENT SS	EFFLUENT ALK	EFFLUENT NH3N	EFFLUENT NO3N HACH	PH	TEMP	30 MIN SET	DO	OUR
74	05	02	0900	B2	3170		5060										
74	05	02	AM	B2	3455				34				7.2	6.0		5.3	
74	06	02	AM	B2					32				7.5	9.8		5.7	
74	07	02	AM	B2	4070		3850	8	34				7.5	11.0		4.7	
74	08	02	AM	B2	3850				35				7.5	10.5		4.6	
74	09	02	PM	B2	2950				44					11.0		3.7	
74	10	02	AM	B2	3560				19					10.8		4.1	
74	11	02	AM	B2	4240	3070			29	145			7.5	9.8	205	4.4	6.88
74	11	02	PM	B2	3480	2560											
74	12	02	AM	B2	3220				38				7.2	11.0		3.4	
74	13	02	AM	B2	6310	4360			44				7.8	10.0	210	6.1	5.31
74	13	02	PM	B2	4300												
74	14	02	PM	B2	3070		4434	14	24				7.4	10.5		3.5	5.26
74	15	02	AM	B2	4690				58				7.0	10.8		3.6	
74	16	02	AM	B2	4240				20					11.0		3.5	
74	17	02	AM	B2	4890		9310	22	9					10.0		3.5	
74	18	02	AM	B2	5080		9330	19	70				7.4	10.0		3.9	
74	18	02	PM	B2			8750	15									
74	19	02	AM	B2	3860	2790	7340	47	35	141			7.8	8.5		5.0	
74	19	02	PM	B2	3970									9.5		4.0	
74	20	02	AM	B2	5750				25				7.4	11.3		2.6	
74	20	02	PM	B2			8430	25									
74	21	02	AM	B2	4460	3200			23	100			7.4	11.0	300	3.0	4.55
74	21	02	PM	B2	5150		8010	10									
74	22	02	AM	B2	5210				30				7.1	15.3		2.7	
74	22	02	PM	B2			3410	25									
74	23	02	AM	B2	3870		5430	26	38					15.3		3.5	
74	24	02	AM	B2	2570		5560	16	12					15.5		4.2	
74	24	02	PM	B2			4440	13									
74	25	02	AM	B2	2090				51				7.5	15.0		3.9	
74	26	02	AM	B2	2460				51				7.7	15.3		3.2	
74	27	02	AM	B2	2010	1360			47	76			7.3	15.0	130	6.1	14.40
74	27	02	PM	B2	2430												
74	28	02	AM	B2	1920				42				7.4	16.0		6.5	
74	01	03	AM	B2	1050	760			39	80			7.5	15.0	80	6.1	31.69
74	02	03	AM	B2	1330				61					15.0	75	6.2	
74	03	03	AM	B2	1110				49				7.6	15.0		8.6	
74	04	03	AM	B2	930				70				7.6				
74	04	03	PM	B2	1420												
74	05	03	AM	B2	1230				92				7.8	6.0		10.4	
74	06	03	AM	B2	1090	1288			96				8.2	5.0		10.0	
74	07	03	AM	B2									8.0	6.0		10.9	
74	08	03	AM	B2	1360	1260			83				7.8	10.0		9.3	
74	09	03	AM	B2	1320				134				7.8	5.8		10.8	
74	10	03	AM	B2	1370				75					5.3		10.1	
74	11	03	AM	B2	1850				73				7.8	5.5		10.8	
74	12	03	AM	B2	3800				54			13	7.5	10.5		4.6	
74	13	03	AM	B2	3420				138				7.8	10.5		4.4	

REACTOR OPERATING RESULTS

YEAR	DATE DAY	DATE MON	TIME	REACTOR	MLSS	VSS	WASTE CONC	IGAL WASTE	EFFLUENT SS	EFFLUENT ALK	EFFLUENT NH3N	EFFLUENT NO3N HACH	PH	TEMP	30 MIN SET	DO	OUR
74	14	03	AM	B2	2100				54		14	5	7.6	9.8		4.6	
74	15	03	AM	B2	1840	1380			88				7.8	9.8		5.2	3.30
74	15	03	PM	B2	1540												
74	16	03	AM	B2	960				88				7.8	10.0		9.3	
74	16	03	PM	B2	3070												
74	17	03	AM	B2	3380				80								
74	18	03	AM	B2	2660				77				7.6	10.5		8.2	
74	19	03	AM	B2	5280				45				7.5	9.0		7.7	
74	20	03	AM	B2	5690				27				7.4	10.8		5.1	
74	20	03	PM	B2			9110	10									
74	21	03	AM	B2	6090		8800	20	33		9	6	7.4	10.9		6.7	
74	22	03	AM	B2	5360				51				7.3	12.0		6.3	
74	22	03	PM	B2			12950	10									
74	23	03	AM	B2	4570		3610	10	64					10.8		6.0	
74	24	03	AM	B2	4580		4150	10	70					12.0		7.0	
74	25	03	AM	B2	2210	1820			86	131			7.6	10.0	100	8.1	7.34
74	25	03	PM	B2	2370												
74	27	03	AM	B2	6150				38				7.4	13.3		4.4	
74	27	03	PM	B2			7960	20									
74	28	03	AM	B2	5470				43				7.4	12.3		5.4	
74	29	03	AM	B2	5450				46				7.5	5.8		9.7	
74	30	03	AM	B2	5320				65					6.5		8.7	
74	31	03	AM	B2	3090				27								
74	01	04	AM	B2	3980				31				7.7	11.3		6.6	
74	02	04	AM	B2	2560				20				7.5	10.5		6.5	
74	03	04	AM	B2	2670	2040			147	120			7.5	10.5	195	3.8	4.88
74	03	04	PM	B2	3890		3680	3									
74	04	04	AM	B2	4600				21				7.9	10.5		6.1	
74	05	04	AM	B2	3110	2190			22	161			7.5	10.5	190	6.5	6.20
74	05	04	PM	B2	3280		5830	6									
74	06	04	AM	B2	4630				39					11.0		6.2	
74	07	04	PM	B2	2670		4750	6	28								
74	08	04	AM	B2	4000		3340	3	16				7.6	15.0		5.5	
74	09	04	0900	B2	2400	1930	6810										
74	09	04	1200	B2	3390	5310											
74	09	04	1500	B2	2370	1610	6170										
74	09	04	1800	B2	2570		3640										
74	09	04	2100	B2	3500		5840										
74	09	04	AM	B2					36	70			7.7	15.0	180	3.6	4.46
74	10	04	0900	B2	2940	1970	3970										
74	10	04	1200	B2	3310		3910										
74	10	04	1500	B2	2890	1920	6820										
74	10	04	1800	B2	2840		6260										
74	10	04	2100	B2	4450		5600										
74	10	04	AM	B2					24	41			7.5	15.3	175	3.5	2.84
74	11	04	AM	B2	3540												
74	12	04	AM	B2	2400				29								
74	13	04	AM	B2	2620		3690	2	15								

REACTOR OPERATING RESULTS

YEAR	DATE DAY	DATE MON	TIME	REACTOR	MLSS	VSS	WASTE CONC	IGAL WASTE	EFFLUENT SS	EFFLUENT ALK	EFFLUENT NH3N HACH	EFFLUENT NO3N	PH	TEMP	30 MIN SET	DO	OUR
74	14	04	AM	B2	3380				42								
74	15	04	AM	B2	3710				32								
74	15	04	PM	B2	3920		5810	40	93								
74	16	04	AM	B2	3450	2470			35	93			7.4	6.3	280	2.4	2.94
74	16	04	PM	B2	4890		6740	3									
74	17	04	AM	B2	5470								7.3	6.5		4.4	
74	17	04	PM	B2			5990	5									
74	18	04	AM	B2	4280	2940			13	87			7.5	5.3	325	8.6	4.11
74	18	04	PM	B2	4920		6840	10									
74	21	04	AM	B2	4190		6470	6	18								
74	22	04	AM	B2	5070				20				7.3	12.0		1.9	
74	22	04	PM	B2			11650	16									
74	23	04	AM	B2	4030	2840			10	66			7.3	11.8	320	2.1	6.05
74	23	04	PM	B2	5100												
74	24	04	AM	B2	4710				16				7.3	11.0		3.5	
74	24	04	PM	B2			3460	9									
74	25	04	AM	B2	3760	2540			12	99			7.3	11.0	275	7.9	3.44
74	25	04	PM	B2	3730		4350	10									
74	28	04	PM	B2	3270				8								
74	29	04	AM	B2	3060				21				7.4	20.8		5.7	
74	30	04	0900	B2	3660	2440	8290										
74	30	04	1200	B2	4030		7210										
74	30	04	1500	B2	4310	2840	7230										
74	30	04	1620	B2			7380	8									
74	30	04	1800	B2	3590		7080										
74	30	04	2130	B2	3490		6830										
74	30	04	AM	B2					23	47			7.2	20.8	230	4.3	3.93
74	01	05	0900	B2	3770	2550	6960										
74	01	05	1200	B2	4010		7540										
74	01	05	1500	B2	4490	2910											
74	01	05	1730	B2			4980	4									
74	01	05	1800	B2	3160		7210										
74	01	05	2100	B2	3160		6960										
74	01	05	AM	B2					34	15			6.4	20.5	280	2.8	5.84
74	02	05	AM	B2	4760	3030	7310		47								
74	03	05	AM	B2				0						15.0		4.9	
74	04	05	AM	B2				0									
74	05	05	AM	B2				0									
74	06	05	AM	B2	3410				22				7.3	15.0		7.3	
74	07	05	AM	B2	3550				25				7.3	15.0		7.3	
74	07	05	PM	B2			4330	5									
74	08	05	AM	B2	3840				37				7.2	15.0		6.4	
74	08	05	PM	B2			4900	5	5								
74	09	05	AM	B2	2620				25								
74	10	05	AM	B2	2630				36				7.2	15.5		4.7	
74	11	05	AM	B2				0									
74	12	05	PM	B2	2850		6830	2	30								
74	13	05	AM	B2	2910				31				7.5	15.8		6.2	

REACTOR OPERATING RESULTS

YEAR	DATE DAY	DATE MON	TIME	REACTOR	MLSS	VSS	WASTE CONC	IGAL WASTE	EFFLUENT SS	EFFLUENT ALK	EFFLUENT NH3N	EFFLUENT NO3N HACH	PH	TEMP	30 MIN SET	DO	OUR
74	14	05	AM	B2	4450	3100			33	140			7.4	15.3	185	4.5	12.22
74	14	05	PM	B2	4170		6620	5									
74	15	05	AM	B2	4150				26				7.2	15.5		3.1	
74	15	05	PM	B2			4510	2									
74	16	05	AM	B2	3130	2140			20	97			7.3	14.5	175	8.5	
74	16	05	PM	B2	3100		4620	2									
74	17	05	AM	B2	4600				30				7.4	10.0		6.1	
74	18	05	AM	B2				0									
74	19	05	AM	B2	3660				61								
74	20	05	AM	B2	3990				29				7.3	6.3		6.8	
74	20	05	PM	B2			4710	5									
74	21	05	AM	B2	2860	2020			31	188			7.4	6.5	170	8.5	2.62
74	21	05	PM	B2	3550												
74	22	05	AM	B2					28				7.5	5.5		6.9	
74	22	05	PM	B2			6460	2									
74	23	05	AM	B2	5090	3570			46	191			7.3	6.5	230	3.9	3.53
74	23	05	PM	B2	4270		6940	9									
74	24	05	AM	B2	5290			10	33				7.2	7.0		4.4	
74	26	05	PM	B2	6060				8								
74	27	05	AM	B2	5440		9790	21	13				7.3	7.8		5.[illegible]	
74	27	05	1330	B2			13530	16									
74	27	05	1600	B2			8480	10									
74	28	05	AM	B2				20									
74	29	05	AM	B2	4490		8200	22	34				7.2	6.8		8.1	
74	29	05	PM	B2			8070	20									
74	30	05	AM	B2	4480				34				7.3	6.8		4.4	
74	30	05	PM	B2			7260	5									
74	31	05	AM	B2	6050				50				7.4	7.0		2.9	
74	31	05	PM	B2			7970	10									
74	02	06	AM	B2	4810		7830	10	21								
74	03	06	AM	B2	4680				19				7.2	8.0		2.3	
74	03	06	PM	B2			14280	10									
74	04	06	AM	B2	6240	4430			21	203			7.3	8.0	810	2.1	2.96
74	04	06	PM	B2	5500		8470	8									
74	05	06	AM	B2	4900				10				7.2	7.0		3.1	
74	05	06	PM	B2			9890	10									
74	06	06	AM	B2	4630	3330			10	161			7.3	8.0	440	5.5	4.13
74	06	06	PM	B2	5180		8010	10									
74	07	06	AM	B2	5160								7.2	8.0		3.9	
74	07	06	PM	B2				15									
74	10	06	PM	B2	4840		6050	10	12				6.9	12.[illegible]		4.[illegible]	
74	08	06	AM	B2				10									
74	09	06	AM	B2			9290	6									
74	11	06	AM	B2	4780				10				7.4	10.0	515	2.1	6.15
74	11	06	PM	B2	5820		8760	20									
74	12	06	AM	B2					10				7.1	11.0		1.1	
74	12	06	PM	B2			9460	10									
74	13	06	AM	B2	4390				20	46			6.8	10.5	390	2.5	5.67

REACTOR OPERATING RESULTS

YEAR	DATE DAY	DATE MON	TIME	REACTOR	MLSS	VSS	WASTE CONC	IGAL WASTE	EFFLUENT SS	EFFLUENT ALK	EFFLUENT NH3N	EFFLUENT NO3N HACH	PH	TEMP	30 MIN SET	DO	OUR
74	13	06	PM	B2	4630	3740	9030	24					6.7	10.0		2.6	
74	14	06	AM	B2	4650								6.8	10.0		3.6	
74	14	06	PM	B2				13									
74	15	06	AM	B2				13									
74	16	06	PM	B2	3640		5570	13	10								
74	17	06	AM	B2	4090				12				7.0	10.5		6.5	
74	17	06	1700	B2			6650	8									
74	18	06	AM	B2	3390	2840			10				6.9	10.0	265	5.5	5.18
74	18	06	PM	B2	3680		6360	15									
74	19	06	AM	B2	3610				18				5.8	10.5		3.1	
74	19	06	PM	B2			6370	15									
74	20	06	AM	B2	3140	2370			8	33			6.9	9.0	240	3.6	4.72
74	20	06	PM	B2	2960		5410	8									
74	21	06	AM	B2	2940								6.8	10.5		3.7	
74	23	06	PM	B2	2840		4680	9	30								
74	24	06	AM	B2	2690				22				7.2	17.0		6.6	
74	25	06	AM	B2	2580				58				7.2	18.5		4.7	
74	25	06	PM	B2			13390	3									
74	26	06	AM	B2	2160	1910			21	9			6.4	15.5	220	6.6	3.12
74	26	06	PM	B2	3030												
74	27	06	AM	B2	2550				25				6.3	17.0		5.8	
74	28	06	AM	B2	2590	2180			24	24			7.0	18.0	190	1.9	5.96
74	28	06	PM	B2	2210									16.0			
74	29	06	AM	B2	2200			3	16								
74	01	07	AM	B2	2390				27								
74	02	07	AM	B2	2350	1283			33	18			6.6	16.0	180	3.8	2.94
74	03	07	AM	B2	2840				16				6.7	16.0		4.3	
74	03	07	PM	B2			5020	6									
74	04	07	AM	B2	2740				24				6.1	15.0		5.0	
74	04	07	PM	B2			3310	12									
74	05	07	AM	B2	2840				30	13			5.7	15.0	200	5.6	5.71
74	05	07	PM	B2	2620		4110	12						15.0		1.0	
74	06	07	AM	B2	2660												
74	07	07	AM	B2				12									
74	08	07	AM	B2	3570				20				7.0	8.0		2.8	
74	08	07	PM	B2			5910	15									
74	09	07	AM	B2	4060				11				7.0	10.0		6.1	
74	09	07	PM	B2			7620	6									
74	10	07	AM	B2	4290	3190			27	71			7.0	9.0		3.1	4.09
74	10	07	PM	B2	4360		6910	15						3.0		1.4	
74	11	07	AM	B2	5090				25				7.1	8.[illegible]		2.4	
74	11	07	PM	B2			8740	6									
74	12	07	AM	B2	5810	3840			17	70			7.0	8.0	400	3.0	4.56
74	12	07	PM	B2			9200	18									
74	13	07	AM	B2	4940			24									
74	14	07	AM	B2	4310		8220	24	20								
74	15	07	AM	B2	4560				17				7.0	15.5		3.6	
74	15	07	PM	B2			8010	21									

REACTOR OPERATING RESULTS

YEAR	DATE DAY	DATE MON	TIME	REACTOR	MLSS	VSS	WASTE CONC	IGAL WASTE	EFFLUENT SS	EFFLUENT ALK	EFFLUENT NH3N	EFFLUENT NO3N HACH	PH	TEMP	30 MIN SET	DO	OUR
74	16	07	AM	B2	3960	2870			18	109			7.0	15.0	290	1.5	9.88
74	16	07	PM	B2	4140		7640	21						16.0		2.4	
74	17	07	AM	B2	3780				40				6.8	16.0		3.3	
74	17	07	PM	B2			8260	18									
74	18	07	AM	B2	3690	2730			37	33			6.8	15.5	260	2.6	8.36
74	18	07	PM	B2	3670		7690	6						15.0		1.9	
74	19	07	AM	B2	3800				33				6.7	15.5		3.6	
74	19	07	PM	B2			8310	21									
74	20	07	AM	B2	3200		1270	30	25								
74	21	07	AM	B2	2760		6650	21									
74	22	07	AM	B2	2790	2150			29	47			6.8	14.0	200		8.57
74	22	07	PM	B2	2810												
74	23	07	AM	B2	3140												
74	25	07	AM	B2	3320				25				7.0	21.0		5.4	
74	26	07	AM	B2	3070				37				7.1	2.1	0	2.7	
74	26	07	AM	B2			6540	5									
74	27	07	AM	B2	3090				56								
74	28	07	AM	B2	3000				37								
74	29	07	AM	B2	3200				35				7.1	21.5		4.6	
74	30	07	AM	B2	2850	2060			40	3			6.3	21.5	180	3.0	9.44
74	30	07	PM	B2	2960												
74	31	07	AM	B2	2980				23				6.1	20.5		3.7	
74	01	08	AM	B2	6600				23				6.1				
74	01	08	PM	B2			8750	21									
74	02	08	AM	B2	4630				11				7.1	21.5		6.1	
74	02	08	PM	B2			10900	10									
74	03	08	AM	B2	4680				45								
74	04	08	AM	B2	4000												
74	05	08	AM	B2	3730				13								
74	06	08	AM	B2	3740	2650			21	9			5.7	20.5	350	8.7	3.15
74	06	08	PM	B2	3880		8070	11						20.0		4.0	
74	07	08	AM	B2	3600				19				6.1	21.0		4.0	
74	07	08	PM	B2			6270	11									
74	08	08	AM	B2	3360	2440			30	17			6.0	22.0	230	4.1	11.15
74	08	08	OM	B2	3740		6850	7						22.0		3.8	
74	09	08	AM	B2	3560								6.4	2.1	5	4.1	
74	11	08	AM	B2	2890				30								
74	12	08	AM	B2	2920				53				7.2	21.5		6.1	
74	13	08	AM	B2	2870	2040			30	10			6.4	22.0	220	5.	7.53
74	13	08	PM	B2	2790									22.0		3.2	
74	14	08	AM	B2	2730				9				5.7	21.5		5.1	
74	15	08	AM	B2	2420	1610			48	3			6.3	20.5		5.9	8.42
74	15	08	PM	B2	2570									20.5		4.8	
74	16	08	AM	B2	2410				48				5.8	20.0		4.5	
74	18	08	AM	B2	2390				32								
74	19	08	AM	B2	2540				37				7.2	11.5		7.2	
74	20	08	AM	B2	2910	2150			20	46			6.8	12.5	230	3.1	9.84
74	20	08	PM	B2	2950									12.0		2.1	

REACTOR OPERATING RESULTS

YEAR	DATE DAY	DATE MON	TIME	REACTOR	MLSS	VSS	WASTE CONC	IGAL WASTE	EFFLUENT SS	EFFLUENT ALK	EFFLUENT NH3N	EFFLUENT NO3N HACH	PH	TEMP	30 MIN SET	DO	OUR
74	21	08	AM	B2	3190				29				6.9	11.5		2.1	
74	21	08	PM	B2			5790	6									
74	22	08	AM	B2	3160	2340			40	27			6.8	14.0	240	4.4	11.10
74	22	08	PM	B2	3110		5870	6						13.5		1.2	
74	23	08	AM	B2	3480								6.5	13.0		3.9	
74	23	08	PM	B2				6									
74	25	08	AM	B2	3010				56					6.5			
74	26	08	AM	B2	9750			25									
74	27	08	AM	B2	5190		8030	56	32				7.1	10.0		4.4	
74	28	08	AM	B2	5940				148				7.3	8.0		7.6	
74	28	08	PM	B2			9900		9								
74	29	08	AM	B2	5410	3580	9530	20	28	82			7.2	8.5	745	3.4	
74	29	08	PM	B2	5490												
74	30	08	AM	B2	5940		9430	20					7.0	9.5		3.3	
74	31	08	AM	B2				16									
74	01	09	AM	B2	5160				37								
74	02	09	AM	B2	4750		9110	6	18								
74	03	09	AM	B2	4910				18				7.2	25.0		6.5	
74	03	09	PM	B2			6420	9									
74	04	09	AM	B2	4100				19				7.2	25.0		4.6	
74	04	09	PM	B2			7810	15									
74	05	09	AM	B2	4190				18				7.3	25.0		3.9	
74	05	09	PM	B2			7330	10									
74	06	09	AM	B2	3730	2430			37	8			6.7	24.5	370	2.3	17.17
74	06	09	PM	B2	3820		7390	10								0.5	
74	07	09	AM	B2	3680												
74	08	09	AM	B2	3560				20								
74	08	09	PM	B2			7090	6									
74	09	09	AM	B2	3440				13				7.0	25.0		4.6	
74	10	09	AM	B2	3540	2370			25	6			6.5	25.0	400	0.5	11.96
74	10	09	PM	B2	3360		6800	10								1.7	
74	11	09	AM	B2	3530				20				5.8	25.0		3.6	
74	11	09	PM	B2			6790	3								4.1	
74	12	09	AM	B2	3980	2720			26	12			6.0	25.5	625	1.3	17.22
74	12	09	PM	B2	4380		7780	10								0.5	
74	13	09	AM	B2	3830			20					6.8	24.5		0.2	
74	15	09	AM	B2	5470				19								
74	16	09	AM	B2	5770				21				7.0	21.0		4.2	
74	16	09	PM	B2			15180	22									
74	17	09	AM	B2	5290	3360	10110	40	8	41			6.9	21.0	570	0.9	10.68
74	17	09	PM	B2	4740												
74	18	09	AM	B2	5480		9260	25	11				6.8	20.5		2.1	
74	18	09	PM	B2			8920	20									
74	19	09	AM	B2	4600	3040			14	26			6.5	20.0	710	1.4	13.25
74	19	09	PM	B2	4910		8650	10								0.3	
74	20	09	AM	B2	4600								6.8	21.0		0.3	
74	20	09	PM	B2				10									
74	22	09	AM	B2	4630		7490	25	17								

REACTOR OPERATING RESULTS

YEAR	DATE DAY	DATE MON	TIME	REACTOR	MLSS	VSS	WASTE CONC	IGAL WASTE	EFFLUENT SS	EFFLUENT ALK	EFFLUENT NH3N	EFFLUENT NO3N HACH	PH	TEMP	30 MIN SET	DO	OUR
74	23	09	AM	B2	3650		8960	10	15								
74	23	09	PM	B2			6450	12									
74	24	09	AM	B2	5560				30				6.0	20.0		4.7	
74	24	09	PM	B2			7190	18									
74	25	09	AM	B2	3120	2190			30	8			5.6	22.0	290	5.9	13.10
74	25	09	PM	B2	3190		6250	16						20.5		1.4	
74	26	09	AM	B2	2580				33				6.3	20.0		4.2	
74	26	08	PM	B2				95									
74	27	09	AM	B2	2720	2020			44	8			5.4	20.0	220	6.5	9.58
74	27	09	PM	B2	2290									20.0		2.5	
74	28	09	AM	B2	2430												
74	30	09	AM	B2	3370				32				7.0	8.5		5.6	
74	01	10	AM	B2	3780				53				6.9	7.5		5.0	
74	01	10	PM	B2	3710		6330	8						7.0		6.3	
74	02	10	AM	B2	4230				84				7.2	5.5		6.0	8.84
74	03	10	AM	B2	4710	3360			21	64			7.0	8.0	725	1.0	
74	03	10	PM	B2	5140									8.5			
74	04	10	PM	B2			7300	8									
74	05	10	AM	B2			8640	10									
74	04	10	AM	B2	5140	3600							7.0	7.5		3.8	
74	06	10	AM	B2	5820	4950		12									
74	07	10	AM	B2	5430		9730	10	21				6.9	8.5		8.0	
74	07	10	PM	B2			9050	20									
74	08	10	AM	B2	5158	4660			18	50			6.9	8.5	910	8.1	6.01
74	08	10	PM	B2	5230		8540	20						8.5		6.3	
74	09	10	AM	B2	5070		8770	10	23				6.6	8.5		6.3	
74	09	10	PM	B2			9340	10									
74	10	10	AM	B2	4940	3570			21	52			6.7	8.5		6.7	3.10
74	10	10	PM	B2	5110		8000	16						8.0		3.0	
74	11	10	AM	B2	4630			20					6.8				
74	11	10	PM	B2				10									
74	12	10	AM	B2				20									
74	12	10	PM	B2				10									
74	13	10	AM	B2	4430				11								
74	14	10	AM	B2	4370		7970	20	15					20.9		7.3	
74	15	10	AM	B2	4530				42				7.1	20.5		6.1	
74	15	10	PM	B2			8650	20									
74	16	10	AM	B2	3980				20					20.5		2.8	
74	16	10	PM	B2	4870		7150	8						20.5		4.5	
74	17	10	AM	B2	3440				28				7.1	20.5		6.1	
74	17	10	PM	B2			6200	10									
74	18	10	AM	B2	3440	2350			34	51			6.6	20.5	310	2.8	20.27
74	18	10	PM	B2	3220		5630	15						20.5		1.3	
74	19	10	AM	B2				5									
74	20	10	AM	B2	3260		5750	10	44								
74	21	10	PM	B2				47									
74	21	10	PM	B2				35									
74	22	10	AM	B2	5350		9840	15	54				7.3	24.0		6.1	

REACTOR OPERATING RESULTS

YEAR	DATE DAY	DATE MON	TIME	REACTOR	MLSS	VSS	WASTE CONC	IGAL WASTE	EFFLUENT SS	EFFLUENT ALK	EFFLUENT NH3N HACH	EFFLUENT NO3N	PH	TEMP	30 MIN SET	DO	OUR
74	23	10	AM	B2	5000				11				7.0	26.0		4.0	
74	23	10	PM	B2			10630	15									
74	24	10	AM	B2	5570				14				6.9	25.0		4.5	
74	24	10	PM	B2			10540	20									
74	25	10	AM	B2	6140	4020	12020	18	19	60			7.3	25.5	695	0.5	17.51
74	25	10	PM	B2	5286		11890	15						25.5		2.3	
74	25	10	AM	B2			11670	20									
74	26	10	AM	B2	5350		11060	20					7.2	25.0		3.3	
74	27	10	AM	B2	6410		13020	20	17								
74	28	10	AM	B2	5310	3590			32	65			6.9	25.0	750	2.1	12.89
74	28	10	PM	B2	5280		10470	15						24.5		1.8	
74	29	10	AM	B2	4780								7.0	25.0		5.8	
74	29	10	PM	B2				15									
74	30	10	PM	B2				10									
74	31	10	AM	B2	3430				32				7.0	25.0		6.0	
74	01	11	AM	B2	2900				22				6.9	25.0		6.0	
74	02	11	AM	B2	3330				18								
74	03	11	AM	B2	2500				21								
74	04/11/74 DUE TO OPERATOR ERROR NO VSS WAS TAKEN, THEREFORE THE VSS VALUE																
74	SHOWN WAS BASED ON A VSS OF 70 PER CENT																
74	04	11	AM	B2	2310	1617			25	61			7.2	25.0	140	3.8	31.03
74	04	11	PM	B2	2070		5940	4						24.0		2.0	
74	05	11	AM	B2	1950				32				7.2	25.0		7.6	
74	05	11	PM	B2	1950		6860	5									
74	06/11/74 DUE TO OPERATOR ERROR NO VSS WAS TAKEN, THEREFORE THE VSS VALUE																
74	SHOWN WAS BASED ON A VSS OF 85 PER CENT																
74	06	11	AM	B2	1690	1441			29	12			7.0	24.0	120	3.4	27.16
74	06	11	PM	B2	1660									24.5		4.3	
74	07	11	AM	B2	1360								6.7	25.0		5.0	
74	10	11	AM	B2	2240				45								
74	11	11	AM	B2	2110				10					25.0		6.5	
74	12	11	AM	B2	2300				16				7.2	25.0		4.9	
74	13	11	PM	B2	2300	1680			28	37			7.0	25.0	170	3.2	26.41
74	13	11	PM	B2	2150									25.0		3.4	
74	14	11	AM	B2	1910				29				6.7	24.5		4.2	
74	15	11	AM	B2	1720	1230			36	3			6.4	24.5	130	2.1	24.14
74	15	11	PM	B2	1660								6.5	25.0		5.5	
74	18	11	AM	B2	1680				10				7.3	13.5		9.2	
74	19	11	AM	B2	2850		9190	30	9				7.3	11.0		7.7	
74	19	11	PM	B2			6760	3									
74	20	11	AM	B2	3100				4				7.4	10.5		7.7	
74	20	11	PM	B2			5060	10									
74	21	11	AM	B2	3010				5				7.2	11.0		7.0	
74	22	11	AM	B2	2800	2130	4500	10	17	41			7.1	11.0	640	1.3	11.38
74	22	11	PM	B2	2790									10.5		1.8	
74	23	11	AM	B2	2850		4570	10	18								
74	24	11	AM	B2	2690		6360	13									
74	25	11	AM	B2	2710	2020			24	17			6.8	11.0	290	4.[illegible]	11.07

REACTOR OPERATING RESULTS

YEAR	DATE DAY	DATE MON	TIME	REACTOR	MLSS	VSS	WASTE CONC	IGAL WASTE	EFFLUENT SS	EFFLUENT ALK	EFFLUENT NH3N	EFFLUENT NO3N HACH	PH	TEMP	30 MIN SET	DO	OUR
74	25	11	PM	B2	2710									12.0		5.0	
74	26	11	AM	B2	2890				31				6.7	11.0		5.1	
74	27	11	AM	B2	3140	2130			32	9			7.0	11.0	330	2.3	9.57
74	27	11	PM	B2	3190									11.0		2.1	
74	29	11	PM	B2				10									
74	30	11	AM	B2				10									
74	01	12	AM	B2	2810		6960	10	12								
74	02	12	AM	B2	3000				22				7.3				
74	02	12	PM	B2			4640	7									
74	03	12	AM	B2	3000				34								
74	03	12	PM	B2			4490	12									
74	04	12	AM	B2	2980				39								
74	05	12	AM	B2										14.5		4.7	
74	05	12	PM	B2										12.5		3.2	
74	06	12	AM	B2										11.0		4.5	
74	06	12	AM	B2										11.0		3.8	
74	06	02	AM	B2	2840		2840	20	37								
74	06	12	PM	B2				10									
74	07	12	AM	B2				10									
74	08	12	AM	B2	2810		2400	15	15								
74	09	12	AM	B2	2870				20								
74	09	12	PM	B2			4350	10									
74	10	12	AM	B2	2670				40				7.2	6.0		6.3	
74	10	12	PM	B2			4770	10						5.4		4.2	
74	11	12	AM	B2	2950				33				7.4	6.5		4.9	
74	11	12	PM	B2			4990	10									
74	12	12	AM	B2	3400				29				7.2	7.0		4.0	
74	12	12	PM	B2			5610	7									
74	13	12	AM	B2	3640				12				7.3	6.5		4.1	
74	13	12	PM	B2			5940	10									
74	14	12	AM	B2	3800			10									
74	16	12	AM	B2	3830				26					12.0		5.8	
74	15	12	PM	B2			5930	7									
74	17	12	AM	B2	3580				29				7.4	11.0		6.5	
74	17	12	PM	B2	3060		6640	10					7.5	10.0		2.9	
74	18	12	AM	B2	3270				20				7.4	11.5		5.7	
74	19	12	AM	B2	3240				20				7.3	11.5		4.4	
74	19	12	PM	B2			5580	5									
74	20	12	AM	B2	3180				25				7.2				
74	20	12	PM	B2			5410	5									
74	21	12	AM	B2	3200				24								
75	14	01	AM	B2	4380												
75	15	01	AM	B2	3660								7.2	18.0		5.9	
75	15	01	PM	B2			2660	25									
75	16	01	AM	B2	2740		2740	60	64	7.3			15.	5	7.3		
75	17	01	AM	B2	2400		2400	60	35				7.2	15.5		7.1	
75	18	01	AM	B2	1880				40								
75	19	01	AM	B2	1820		1820	15	52								

REACTOR OPERATING RESULTS

YEAR	DATE DAY	DATE MON	TIME	REACTOR	MLSS	VSS	WASTE CONC	IGAL WASTE	EFFLUENT SS	EFFLUENT ALK	EFFLUENT NH3N	EFFLUENT NO3N HACH	PH	TEMP	30 MIN SET	DO	OUR
75	20	01	AM	32	1860		1860	20	26				7.4	10.5		6.4	
75	21	01	AM	B2	1780				54				7.2	10.5		6.0	
75	22	01	AM	B2	2040				42				7.2	11.0		6.0	
75	23	01	AM	B2	2050				6								
75	24	01	AM	B2	2160				27				7.0	12.0		3.8	
75	26	01	AM	B2	1940				24								
75	27	01	AM	B2	2600				13					12.0		5.8	
75	28	01	0900	B2	2600	2010			25								
75	28	01	1100	B2	2530												
75	28	01	1300	B2	2540												
75	28	01	1900	B2	3370												
75	28	01	2100	B2	3550												
75	28	01	2300	B2	3970												
75	29	01	0100	B2	2510												
75	29	01	0300	B2	2550												
75	29	01	0500	B2	2440												
75	29	01	0815	B2	2550		5030										
75	29	01	0900	B2	2450	1910			33								
75	29	01	1100	B2	2540												
75	29	01	1300	B2	2590												
75	29	01	1500	B2	2470		2470	10	47								
75	29	01	1700	B2	2250												
75	29	01	1900	B2	2310												
75	29	01	2100	B2	2580												
75	29	01	2300	B2	2360												
75	30	01	0100	B2	2370												
75	30	01	0300	B2	2440												
75	30	01	0500	B2	2410												
75	30	01	0700	B2	2440												
75	30	01	0900	B2	2530	1950	2530	10	32								
75	31	01	PM	32				10									
75	01	02	AM	B2				20									
75	02	02	AM	B2	1940		1940	15	32								
75	03	02	AM	32	1990				30				7.2	11.5		5.0	
75	04	02	AM	B2	2430		2430	25	18				7.3	11.0		5.3	
75	05	02	AM	B2	2200				39				7.5				
75	07	02	AM	B2	2670		2670	10	38				7.3	11.0		4.8	
75	08	02	AM	B2	2970		2970	10	56								
75	09	02	AM	B2	2880				44								
75	10	02	AM	B2	2610	2180			58	71			7.3	10.5	200	4.5	7.90
75	10	02	PM	B2	2480									10.5		5.5	
75	11	02	AM	B2	2930				40					11.0		6.6	
75	13	02	AM	B2	3900				116				7.8	10.5		4.0	
75	14	02	AM	B2	4320				76				6.9	11.0		3.7	
75	15	02	AM	B2	4450				49								
75	16	02	AM	B2	4260				50								
75	17	02	AM	B2	4150				56				7.3	11.0		5.3	
75	18	02	AM	B2	4010				44				7.1	11.0		5.3	

REACTOR OPERATING RESULTS

YEAR	DATE DAY	MON	TIME	REACTOR	MLSS	VSS	WASTE CONC	IGAL WASTE	EFFLUENT SS	ALK	NH3N	NO3N HACH	PH	TEMP	30 MIN SET	DO	OUR
75	19	02	AM	B2	3740				41				7.4	11.0		4.6	
75	20	02	AM	B2	3420	2430			100	27			7.1	11.5	280	3.9	7.68
75	20	02	PM	B2	3380									11.0		2.3	
75	21	02	AM	B2	3310				94								
75	22	02	AM	B2	3400				53					15.5		5.1	
75	23	02	AM	B2	3080				40					16.0		5.1	
75	24	02	AM	B2	3000				34					16.5		6.5	
75	25	02	AM	B2	2760				45				7.7	16.0		7.1	
75	26	02	AM	B2	2740	1940			27	15			6.8	16.5	260	4.7	3.55
75	26	02	PM	B2	2670												
75	26	02	PM	B2	2670									16.0		2.0	
75	27	02	AM	B2	2720		2720	40	26								
75	27	02	PM	B2													
75	28	02	AM	B2	2370		2370	20	15				7.3	16.5		4.7	
75	01	03	AM	B2	2190		2190	30	16								
75	02	03	AM	B2	1960		1960	35	22								
75	03	03	AM	B2	1830	1320	1780	30	15	80			7.6	16.5		6.4	
75	03	03	1500	B2	1710												
75	04	03	0900	B2	1750	1250	1690	40	19				7.3	16.1		5.2	
75	04	03	1600	B2	1630					79	0.3			14.0		5.2	
75	05	03	0900	B2	1600	1070	1500	35	19	56			7.4	11.5		5.5	
75	05	03	1600	B2	1410				46					11.5		5.3	
75	06	03	0830	B2	1690	1210	1630	35	28	65			7.4	11.0		5.4	
75	06	03	1600	B2	1560				18								
75	07	03	0900	B2	1500	1080	1510	32	26	75			7.4	11.0		5.2	
75	07	03	1600	B2	1520				24								
75	08	03	AM	B2	1400		1400	30	36								
75	09	03	AM	B2				30									
75	10	03	0930	B2	1640		1640	35	21				7.4	15.5		6.1	
75	11	03	0930	B2	1490	1230	1560	20	22	71	0.4		7.2	14.9		4.7	
75	11	03	1640	B2										15.5		[illegible]	
75	11	03	1600	B2	1660				27					15.5		[illegible]	
75	12	03	0930	B2	1490	1270	1490	20	35	18	0.6			15.2		[illegible]	
75	12	03	1600	B2	1480				33					15.2		5.9	
75	13	03	0900	B2	1380	1220			38	47				15.2		7.8	
75	13	03	1500	B2	1400				64				7.6	15.2		7.1	
75	14	03	0900	B2	1480	1150	1520	20	50	112			7.9	15.5		7.5	
75	14	03	1600	B2	1560				31		15.0			15.5		6.8	
75	15	03	0900	B2	1420	1030			38	121			7.8	15.5		7.6	
75	16	03	0900	B2	1310				36	107			7.8	15.5		7.3	
75	17	03	AM	B2	1470	1150			44	97	10.0		7.7	15.5		7.1	
75	17	03	1600	B2	1270				40								
75	18	03	AM	B2	1220	940			58	80	6.0		7.5	16.0		6.3	
75	18	03	1600	B2	1210				45								
75	19	03	0900	B2	1270				45				7.4	15.5		5.5	
75	21	03	0900	B2	1410				50				7.4	15.5		6.9	
75	22	03	0900	B2	1370												
75	23	03	0900	B2	1380												

REACTOR OPERATING RESULTS

YEAR	DATE DAY	MON	TIME	REACTOR	MLSS	VSS	WASTE CONC	IGAL WASTE	EFFLUENT SS	ALK	NH3N	NO3N HACH	PH	TEMP	30 MIN SET	DO	OUR
75	24	03	0900	B2	1270	930			24	82	0.5		7.7	15.5		7.4	
75	24	03	PM	B2	1230				49					15.0		8.4	
75	25	03	0900	B2	1340	930			49	88			7.8	14.5		8.7	
75	25	03	1600	B2	1200				51		6.8						
75	26	03	0900	B2	1420	1030			38	83	0.5		7.5	14.5		9.0	
75	26	03	1600	B2	1120				36					14.5		7.8	
75	27	03	AM	B2	1070	720				43	86		7.7	15.0		8.8	
75	27	03	1600	B2	1500				46					15.0		8.7	
75	28	03	0900	B2	1190	830											
75	03	04	0900	B2	1520				42				7.5	16.5		7.9	
75	04	04	0900	B2	1380				42				7.6	15.5		7.7	
75	06	04	AM	B2	1300												
75	07	04	0900	B2	1560	1170			36	83	0.5		7.7	15.5		8.1	
75	07	04	1600	B2	1460				47					15.5		7.5	
75	08	04	0900	B2	1270	950			53	98	24.0		7.7	15.0		7.9	
75	08	04	1600	B2	1190				51					15.0		7.5	
75	09	04	0900	B2	1290	1060			28	81	0.1		7.5	15.3		8.6	
75	09	04	1600	B2	1110				34					15.2		8.3	
75	10	04	0900	B2	1240	1020			56	79	0.5		7.5	15.3		8.7	
75	10	04	1600	B2	1130				34					15.3		8.1	
75	11	04	0900	B2	1140	890							7.6	15.0		8.4	
75	14	04	0900	B2	1350								7.3	13.5		6.8	
75	15	04	0900	B2	1260	990			38	153			7.5	15.0		7.6	
75	15	04	1615	B2	1400				32					15.2		7.4	
75	16	04	0845	B2	1210	1000			75	178			7.2	12.0		6.9	
75	16	04	1630	B2	1570				74					12.0		6.7	
75	17	04	0900	B2	1560	1320			50	157			7.2	13.5		5.1	
75	17	04	1600	B2	1310				60					12.5		6.4	
75	18	04	0900	B2	2090	1750			50	151			7.2	14.0		7.4	
75	18	04	1600	B2	1560				60					13.5		6.6	
75	19	04	0830	B2	1260	1000			62	143			7.3	13.[illegible]		6.7	
75	19	04	1430	B2	1240				56					12.5		6.7	
75	20	04	0900	B2	1260	1070	6090	58	44				7.0	13.2		7.4	
75	20	04	1300	B2	1300				48					13.0		7.8	
75	21	04	0845	B2	1320	1130			46	159			7.2	12.5		6.3	
75	21	04	1630	B2	1680				24					12.5		6.3	
75	22	04	0830	B2	1480	1250			54	170			7.0	14.5		5.5	
75	22	04	1600	B2	1430				54					13.0		5.4	
75	23	04	0900	B2	1120	970			60	141			7.1	14.0		4.5	
75	23	04	1600	B2	1140				46					13.0		4.5	
75	24	04	0900	B2	1190	970			80	165			7.3	12.0		5.9	
75	24	04	1600	B2	1290				76					12.5		6.5	
75	25	04	0900	B2	1330	1100			62				7.1	12.5		3.6	
75	01	05	0900	B2	1090				38				7.3	23.5		4.8	
75	02	05	AM	B2	1190				54					24.0		4.6	
75	04	05	AM	B2	780				37								
75	05	05	AM	B2	1090	870			38	81			7.0	24.0	75	4.6	46.56
75	05	05	PM	B2	1020				48					25.6		4.1	

REACTOR OPERATING RESULTS

	DATE						WASTE	IGAL	-----EFFLUENT---		NH3N	NO3N			30 MIN		
YEAR	DAY	MON	TIME	REACTOR	MLSS	VSS	CONC	WASTE	SS	ALK		HACH	PH	TEMP	SET	DO	OUR
75	06	05	AM	B2	850				54				5.8	25.5		3.0	
75	07	05	AM	B2	1850	638			58	71			6.7	25.0		4.9	45.88
75	07	05	PM	B2	850				60					24.3		3.6	
75	08	05	AM	B2	600				48				7.2	26.0		5.6	
75	09	05	AM	B2	1380				60				7.4	13.6		8.6	
75	11	05	AM	B2	1360				40								

REACTOR OPERATING RESULTS

YEAR	DATE DAY	DATE MON	TIME	REACTOR	MLSS	VSS	WASTE CONC	IGAL WASTE	EFFLUENT SS	EFFLUENT ALK	RETURN SLUDGE	PH	TEMP	30 MIN SET	DO	OUR
75	12	05	AM	B2	1360		1350	20	22	163		7.4	13.8		6.8	
75	12	05	ASSUME MLVSS 75 PER CENT													
75	12	05	PM	B2	1340				46		2790		13.5		4.8	
75	13	05	AM	B2	1150	865			60	212	2730	7.4	13.2		5.5	
75	13	05	PM	B2	1120				74		1920		13.0		6.7	
75	14	05	PM	B2	1190				59		2210		12.8		5.3	
75	14	05	AM	B2	1140	860			74	206	1980	7.4	12.8		5.3	
75	15	05	AM	B2	1260	950			66	222	3350	7.4	12.8		5.5	
75	15	05	PM	B2	1290				74		2270		12.6		5.3	
75	16	05	AM	B2	1330	1020			90		1560					
75	23	05	AM	B2	1760				36							
75	25	05	AM	B2	1430				64							
75	26	05	AM	B2	1200	935			74	123	3640	7.4	13.4		8.6	
75	25	05	ASSUME MLVSS 78 PER CENT													
75	26	05	PM	B2	1230				44		2430		13.3		7.1	
75	27	05	AM	B2	1200	935			40	135		7.4	13.5		6.3	
75	27	05	PM	B2	1090				40		1890					
75	28	05	AM	B2	1360	1160			72	152	2090	7.4	13.0		7.1	
75	28	05	PM	B2	1260				56		2720		13.0		6.1	
75	29	05	AM	B2	1520	1250			74	143	3800	7.4	13.0		4.1	
75	29	05	PM	B2	1490				50		1960		13.0		4.1	
75	30	05	AM	B2	1420	1180			28		2640					
75	01	06	AM	B2	1540				42							
75	02	06	AM	B2	1530	1230			46	161	2800	7.4	13.0		5.5	
75	02	06	PM	B2	1520				34		2960		12.9		5.4	
75	03	06	AM	B2	1510	1280			40	179	2510	7.6	13.2		5.4	
75	03	06	PM	B2	1550				42		4470		13.0		2.3	
75	04	06	AM	B2	1540	1270			44	101	3030	7.3	13.0		8.4	
75	04	06	PM	B2	1440				30		2380		13.2		8.4	
75	05	06	AM	B2	1450	1190			42	63	3300	7.2	13.0		8.3	
75	05	06	PM	B2	1310				28		1670		13.0		8.4	
75	06	06	AM	B2	1160	990			44		1610	7.0	13.0		8.3	
75	12	06	AM	B2	1600				60		1640	7.5	17.7		6.4	
75	13	06	AM	B2	1560				32			7.5	18.0		8.0	
75	16	06	AM	B2	1440				38			7.4	18.0		8.6	
75	17	06	AM	B2	2450				28			7.4	18.8		7.6	
75	18	06	AM	B2	2350				34			7.1	19.0		6.3	
75	19	06	AM	B2	2270				36			7.1	19.6		7.2	
75	20	06	AM	B2	2450	1720			54	18		6.3	19.5	185	6.3	18.85
75	20	06	PM	B2	2280				56				18.5		5.2	
75	26	06	AM	B1	1410							7.9	12.	0	7.5	
75	26	06	AM	B3	1340							7.9	12.0		10.1	
75	26	06	AM	B5	1090		1370	45	44			7.7	12.3		8.1	
75	27	06	AM	B1	1570							7.5	14.6		6.6	
75	27	06	AM	B3	1630							7.6	14.0		8.0	
75	27	06	AM	B5	1510		2680	104	38			7.5	13.5		7.1	
75	28	06	AM	B5				94								
75	29	06	AM	B5				94								

REACTOR OPERATING RESULTS

	DATE						WASTE	IGAL	EFFLUENT		RETURN			30 MIN		
YEAR	DAY	MON	TIME	REACTOR	MLSS	VSS	CONC	WASTE	SS	ALK	SLUDGE	PH	TEMP	SET	DO	CUR
75	30	06	AM	B1	1340							7.4	21.0		6.1	
75	30	06	AM	B3	1090							7.6	21.0		8.4	
75	30	06	AM	B5	980		2350	109	36			7.7	21.0		7.5	
75	01	07	AM	B1	1090							7.4	21.0		5.8	
75	01	07	AM	B3	1130							7.3	21.0		7.9	
75	01	07	AM	B5	1100		1160	109	26	142	1490	7.4	21.0		7.3	
75	01	07	PM	B1	1130								21.0		4.5	
75	01	07	PM	B3	1060								21.0		6.4	
75	01	07	PM	B5	1070				42				21.0		6.9	
75	02	07	AM	B1	1110	870						7.4	21.5		4.9	
75	02	07	AM	B3	1150	890						7.5	21.5		6.1	
75	02	07	AM	B5	1080	860	1400	59	36	194	2090	7.5	21.5		5.2	
75	02	07	PM	B1	1290								21.3		4.2	
75	02	07	PM	B3	1320											
75	02	07	PM	B5	1380		2270	51	52		2170		21.2		3.7	
75	03	07	AM	B1	1420	1160						7.9	21.8		2.4	
75	03	07	AM	B3	1420	1140						7.7	21.8		5.5	
75	03	07	AM	B5	1300	1160	1600	114	36	153	2670	7.6	21.8		5.1	
75	03	07	PM	B1	1360								21.0		5.7	
75	03	07	PM	B3	1340								21.0		7.4	
75	03	07	PM	B5	1270				34		1910		21.0		6.7	
75	04	07	AM	B1	800											
75	04	07	AM	B3	800											
75	04	07	AM	B5	650											

Analyses

				UNFILTERED			FILTERED						
YEAR	DAY	MON	SAMPLE DESIGNATION	COD	BOD	TKN	COD	BOD	FOC	NH3N	NO2N	NO3N	TKN
73	09	11	RF-0900	80.7		9.6	34.1			8.1	0.6	8.7	8.1
73	09	11	RF-1200				40.4			24.3	0.3	3.0	24.5
73	09	11	RF-1500	675.0		37.4	76.1			27.2	0.1	0.5	27.2
73	10	11	RF-1045				41.1			13.6	0.5	5.1	13.6
73	11	11	RF-1100				43.2			14.6	0.9	8.6	14.6
73	14	11	RF-C	325.6	162	26.8	57.1		17	21.7	0.1	1.7	21.7
73	15	11	RF-C	505.8	175	25.9	51.1	16	20	16.7	0.3	5.4	17.0
73	19	11	RF-C	342.6	141	16.2	59.3	33	31	16.7	0.2	5.1	16.7
73	20	11	RF-C				51.0			16.3	0.1	2.0	16.3
73	27	11	RF-C	229.0	133	19.9	34.4	19	24	14.0	0.3	1.7	14.3
73	29	11	RF-C	274.0	109	17.0	39.9	25	21	12.4	0.7	4.7	12.4
74	28	01	RF-GAM	83.4		10.4	32.6			7.4	0.1	4.0	8.4
74	29	01	RF-C	396.7	106	17.0	101.5	48	36	11.5	0.1	0.0	11.5
74	31	01	RF-C1	210.7	65	13.1	48.4	24	14	9.2	0.5	3.1	9.2
74	31	01	RF-C2	772.7	160	46.2	75.7	32	33	17.3	0.9	2.0	17.3
74	31	01	RF-C3	656.9	210	32.2	87.6	49	33	16.7	1.3	0.5	18.8
74	31	01	RF-C4	785.1	216	31.0	96.0	49	7	14.5	1.4	1.2	14.5
74	31	01	RF-C5	264.4	126	17.6	98.5	49	37	10.4	0.1	3.2	10.4
74	01	02	RF-C6	404.9	149	22.9	73.4	49	37	12.0	1.1	1.0	13.1
74	01	02	RF-C7	351.0	103	18.1	64.6	41	25	11.5	0.9	1.1	11.7
74	01	02	RF-C8	293.4	76	15.2	60.4	42	16	6.1	0.4	2.6	3.5
74	04	02	RF-C1	244.0	62	14.9	50.7	23	17	11.9	0.4	2.2	11.9
74	04	02	RF-C2	475.2	117	32.8	66.3	37	23	22.7	0.7	0.7	22.7
74	04	02	RF-C3	391.0	149	26.8	87.0	48	49	17.4	0.0	0.1	17.4
74	04	02	RF-C4	375.0	131	25.7	86.0	46	47	17.2	0.4	0.1	17.2
74	04	02	RF-C5	378.0	125	26.4	75.0	22	44	17.3	0.0	0.0	17.3
74	05	02	RF-C6	306.0	109	20.9	73.0	18	39	15.6	[illegible]	0.1	15.6
74	05	02	RF-C7	222.0	78	15.5	57.0	16	35	11.8	0.7	0.8	11.8
74	05	02	RF-C8	213.0	72	13.3	55.0	13	31	9.3	0.7	1.3	9.8
74	04	02	RF-C	297.[illegible]	102	21.3	63.0	47	31	15.1	0.4	0.7	15.1
74	05	02	RF-C1				49.0			11.6	0.3	1.0	11.6
74	05	02	RF-C2				52.0			18.3	0.1	[illegible]	18.3
74	05	02	RF-C3				84.0			18.2	0.0	[illegible]	18.2
74	05	02	RF-C4				93.0			20.1	0.0	[illegible]	20.1
74	05	02	RF-C5				66.0			16.9	[illegible]	0.0	16.9
74	06	02	RF-C6				63.0			15.2	0.0	0.0	15.2
74	06	02	RF-C7				59.0			11.9	0.4	0.9	11.9
74	06	02	RF-C8				57.0			8.8	0.5	2.2	8.8
74	05	02	RF-C				63.0			14.6	0.3	0.7	14.6
74	11	02	RF-C	588.0	193	28.1	187.0	92	106	19.0	0.2	0.8	24.9
74	13	02	RF-C	564	326	30.1	146	73	42	16.7	0.6	2.0	16.7
74	19	02	RF-C	522	205	32.1	121	55	44	20.2	0.3	1.1	20.2
74	21	02	RF-C	402	179	25.2	107	67	46	17.6	0.3	0.0	17.6
74	27	02	RF-C	362	169	32.1	194	69	73	20.7	0.3	0.4	20.7
74	01	03	RF-C	346	173	45.4	141	67	42	36.4	0.1	0.3	36.6
74	04	03	RF-0900	101		11.5	50			9.0	0.2	1.9	9.0
74	04	03	RF-C1				84			20.3	0.2	2.1	20.3
74	04	03	RF-C2				108			18.6	0.3	1.9	18.6

ANALYSES

			SAMPLE	UNFILTERED			FILTERED						
YEAR	DAY	MON	DESIGNATION	COD	BOD	TKN	COD	BOD	FOC	NH3N	NO2N	NO3N	TKN
74	04	03	RF-C3				100			17.4	0.5	2.2	17.5
74	04	03	RF-C4				75			11.6	0.5	0.8	11.6
74	05	03	RF-C5				52			4.8	0.3	2.9	5.1
74	05	03	RF-C6				54			3.8	0.3	3.0	4.2
74	04	03	RF-C	289		33.0							
74	05	03	RF-CC1				56			10.6	0.6	1.4	10.6
74	05	03	RF-CC2				56			10.2	0.7	2.1	10.2
74	06	03	RF-CC3				40			8.1	0.5	3.7	8.1
74	05	03	RF-C	187		14.2							
74	06	03	RF-CC1				48			12.5	0.8	2.7	12.5
74	06	03	RF-CC2				41			11.1	0.7	1.6	11.1
74	07	03	RF-CC3				45			7.3	0.5	2.7	7.3
74	06	03	RF-C	140		14.3							
74	07	03	RF-CC1				42			9.7	0.6	3.3	9.7
74	07	03	RF-CC2				49			12.3	0.7	2.7	12.3
74	08	03	RF-CC3				47			12.8	0.5	2.3	12.8
74	07	03	RF-C	109		15.8							
74	15	03	RF-C	276	100	23.7	49.8	33	30	15.6	0.5	4.0	15.6
74	25	03	RF-C	355	140	26.1	66	26	28	23.4	0.4	5.3	23.4
74	03	04	RF-C	342	108	34.5	78	33	26	26.6	0.8	9.5	26.6
74	05	04	RF-C	335	111	32.8	49	19	8	25.4	0.7	2.0	25.4
74	09	04	RF-C1	187	53	22.1	37	10	11	19.7	0.9	2.7	19.7
74	09	04	RF-C2	297	100	43.0	49	25	20	37.7	0.3	0.0	37.7
74	09	04	RF-C3	378	142	45.7	106	50	36	37.5	0.1	0.0	37.5
74	09	04	RF-C4	333	144	43.5	102	45	34	34.8	0.3	0.0	34.8
74	09	04	RF-C5	365	128	43.3	94	40	28	34.6	0.2	0.0	34.6
74	10	04	RF-C6	337	94	41.5	69	24	20	33.8	0.4	0.0	33.8
74	10	04	RF-C7	268	77	35.5	61	18	14	28.7	0.5	0.9	28.7
74	10	04	RF-C8	183	58	26.5	45	9	11	21.0	0.5	3.0	21.0
74	09	04	RF-C	333	122	38.3	73	24	19	31.2	0.4	0.7	31.3
74	10	04	RF-C1	248	67	37.7	46	6	11	30.1	1.4	2.7	30.1
74	10	04	RF-C2	376	139	49.3	54	16	18	38.0	0.3	0.5	38.1
74	10	04	RF-C3	591	195	53.4	112	73	44	37.9	0.0	0.0	37.9
74	10	04	RF-C4	550	195	49.1	132	60	50	35.4	0.1	0.5	35.5
74	10	04	RF-C5	434	139	43.1	87	43	30	32.2	0.5	0.2	32.2
74	11	04	RF-C6	388	106	41.8	62	27	23	32.4	0.4	0.7	32.4
74	11	04	RF-C7	347	78	39.1	58	19	20	27.2	0.7	1.0	27.4
74	11	04	RF-C8	256	67	38.9	50	18	16	29.3	0.5	2.8	29.3
74	ALL COD ANALYSES ON 09 + 10/04/74 QUESTIONABLE DUE TO ANALYTICAL ERROR												
74	10	04	RF-C	384	106	42.6	54	20	17	27.5	0.7	1.2	27.5
74	16	04	RF-C	376	111	25.4	68	24	26	18.8	0.6	1.8	18.8
74	18	04	RF-C	261	67	29.6	60	33	10	24.1	0.5	1.4	24.1
74	23	04	RF-C	269	79	31.3	72	28	19	32.3	0.6	1.6	32.3
74	25	04	RF-C	347	100	39.7	88	31	28	28.7	0.6	2.1	28.7
74	30	04	RF-C1	203	97	38.6	40	12	14	35.2	0.5	0.6	35.4
74	30	04	RF-C2	457	122	47.8	20	31	27	47.8	0.0	0.0	47.8
74	30	04	RF-C3	496	148	44.2	99	56	51	44.2	0.0	0.0	44.2
74	30	04	RF-C4	383	149	52.9	95	58	44	45.5	0.0	0.0	45.6

ANALYSES

			SAMPLE	UNFILTERED			FILTERED						
YEAR	DAY	MON	DESIGNATION	COD	BOD	TKN	COD	BOD	FOC	NH3N	NO2N	NO3N	TKN
74	30	04	RF-C5	402	201	56.1	111	22	53	47.4	0.0	0.0	47.4
74	01	05	RF-C6	289	87	48.5	64	30	25	43.4	0.0	0.0	43.4
74	01	05	RF-C7	266	76	30.8	52	13	18	30.8	0.5	1.2	30.8
74	01	05	RF-C8	230	85	38.5	49	10	15	36.4	0.6	3.4	36.5
74	30	04	RF-C	348	117	51.5	78	25	28	42.6	0.3	1.0	42.7
74	01	05	RF-C9	200	72	54.1	54	12	19	48.2	0.4	1.3	48.3
74	01	05	RF-C10	308	100	67.0	65	25	24	59.6	0.1	0.3	59.7
74	01	05	RF-C11	428	182	71.7	115	55	59	62.2	0.0	0.2	62.3
74	01	05	RF-C12	510	238	62.7	136	53	66	51.0	0.0	0.2	51.0
74	01	05	RF-C13	660	249	66.1	136	57	64	51.2	0.1	0.3	51.3
74	02	05	RF-C14	360	94	55.3	78	37	35	47.2	0.3	0.4	47.2
74	02	05	RF-C15	233	97	44.5	58	17	22	40.4	0.6	1.3	40.5
74	02	05	RF-C16	199	87	40.2	54	11	16	35.8	1.6	2.0	35.9
74	01	05	RF-C	395	128	58.5	66	36	36	47.4	0.4	0.9	47.4
74	14	05	RF-C	231	85	37.5	36	17	16	32.5	0.4	1.3	32.6
74	16	05	RF-C	239	88	37.3	50	22	20	29.7	0.4	2.0	29.7
74	21	05	RF-C	219	100	19.2	62	22	20	14.3	0.6	7.9	14.3
74	23	05	RF-C	249	99	21.8	62	30	25	15.9	0.4	4.0	15.9
74	04	06	RF-C	310	117	27.5	63	32	34	19.1	0.3	3.1	19.1
74	06	06	RF-C	415	116	27.6	74	30	29	18.5	0.3	3.2	18.5
74	13	06	RF-C	342	116	30.3	83	27	27	27.6	0.1	0.4	27.6
74	18	06	RF-C	283	79	26.8	56	21	21	19.4	0.1	1.5	19.4
74	20	06	RF-C REPRESENTS SAMPLE TAKEN FROM 0900 TO 1900 OTHER 12 SAMPLES MISSING										
74			DUE TO SAMPLER ERROR										
74	20	06	RF-C	446	145	32.6	77	23	33	19.7	0.1	0.6	19.7
74	25	06	RF-C	312	42	36.0	54	10	20	26.6	0.1	1.5	26.6
74	28	06	RF-C	398	134	43.3	104	76	35	33.2	0.0	3.0	33.2
74	02	07	RF-C	349	151	40.8	100	34	30	28.9	0.2	1.0	28.9
74	05	07	RF-C	432	170	43.1	71	29	32	31.4	0.1	1.3	31.4
74	10	07	RF-C	352	176	27.4	93	38	40	20.2	0.4	1.3	20.2
74	12	07	RF-C	335	125	27.6	97	36	44	20.6	0.1	1.2	20.6
74	16	07	RF-C	344	108	39.8	64	32	29	27.9	0.1	1.4	28.1
74	18	07	RF-C	636	190	58.9	72	30	28	28.0	0.1	1.3	30.0
74	22	07	RF-C	392	163	36.7	80	46	46	26.0	0.1	0.5	28.7
74	30	07	RF-C	205	102	51.3	92	37	33	41.5	0.0	2.5	47.7
74	06	08	RF-C	458	198	52.6	36	36	35	36.0	0.1	10.5	39.0
74	08	08	RF-C	751	167	65.9	36	47	41	41.1	0.2	0.7	41.1
74	09	08	RF-0800				20			32.8	0.5	1.1	32.8
74	13	08	RF-C	208	49	39.2	32	15	23	34.0	0.5	1.0	34.3
74	13	08	RF(0900-1700)				36			35.4	0.3	0.5	35.4
74	06	09	RF-C	549	40	62.3	100	16	33	47.5	0.1	0.8	47.5
74	13	08	RF-C	262	72	46.2	41	24	24	38.5	0.2	0.7	39.8
74	20	08	RF-C	332	108	33.5	78	36	30	22.0	0.1	0.2	24.3
74	22	08	RF-C	340	185	49.3	45	32	29	36.0	0.1	1.8	37.5
74	27	08	RF-C	295	134	31.2	67	37	31	19.5	0.1	0.9	22.7
74	29	08	RF-C	467	184	42.0	57	27	27	21.5	0.1	0.3	25.4
74	10	09	RF-C	407	237	65.5	100	85	44	48.7	0.0	0.1	48.7
74	12	09	RF-(9-2300)			.	86			58.5	0.0	0.0	59.3

ANALYSES

YEAR	DAY	MON	SAMPLE DESIGNATION	UNFILTERED COD	UNFILTERED BOD	UNFILTERED TKN	FILTERED COD	FILTERED BOD	FILTERED FOC	FILTERED NH3N	FILTERED NO2N	FILTERED NO3N	FILTERED TKN
74	12	09	RF-C	383	100	69.6	72	24	38	49.0	0.0	0.4	56.2
74	17	09	RF-C	374	87	60.2	100	33	38	45.3	0.1	0.3	45.3
74	19	09	RF-C	310	106	56.3	95	38	38	48.0	0.0	0.6	48.0
74	25	09	RF-C	406	158.	62.2	52	32	41	45.5	0.0	1.5	46.1
74	27	09	RF-C	314	93	58.9	65	48	51	49.0	0.0	0.0	49.3
74	03	10	RF-C	224	87	32.3	64	39	46	24.0	0.0	0.6	24.3
74	08	10	RF-C	274	88	38.3	49	15	39	25.0	0.0	0.0	27.5
74	10	10	RF-C	460	93	46.6	50	38	41	25.5	0.0	0.0	27.3
74	10	10	RF-10-0930	234		37.0	60	154	38	24.0	0.0	0.1	27.5
74	18	10	RF-C	438	96	61.5	100	31	43	42.0	0.0	0.2	42.6
74	25	10	RF-C	365	151	61.0	74	45	51	38.0	0.0	0.5	49.5
74	28	10	RF-C	269	94	55.8	84	41	33	49.1	0.0	0.6	49.1
74	04	11	RF-C	210	61	60.1	92	33	43	58.0	0.0	0.6	58.0
74	06	11	RF-C	392	97	72.3	92	31	34	56.0	0.0	0.7	59.4
74	13	11	RF-C	412	119	97.1	122	33	36	73.0	0.2	1.6	79.1
74	15	11	RF-C	307	99	102.4	74	36	38	89.0	0.1	1.0	90.7
74	25	11	RF-C	220	99	43.0	46	22	24	34.0	0.1	1.0	39.0
74	27	11	RF-C	357	208	51.3	66	30	36	44.0	0.1	0.7	34.2
74	09	12	RF-0900	300		27.5			27	13.9	0.0	1.1	14.4
74	09	12	RF-1100	378		43.3			27	21.4	0.0	0.7	24.5
74	09	12	RF-1300	436		51.0			16	24.0	0.0	0.0	27.4
74	09	12	RF-1500	423		42.2			28	25.1	0.0	0.0	32.5
74	09	12	RF-1700	365		38.3			56	23.0	0.0	0.0	28.7
74	09	12	RF-1900	685		39.0			73	18.7	0.0	0.0	25.4
74	09	12	RF-2100	485		34.5			73	21.0	0.0	0.0	27.8
74	09	12	RF-2300	382		31.2			71	20.9	0.0	0.0	22.3
74	10	12	RF-0100	266		28.2			48	18.9	0.0	0.0	22.6
74	10	12	RF-0300	253		25.7			33	18.5	0.0	0.0	22.6
74	10	12	RF-0500	149		20.8			34	14.3	0.2	1.0	17.2
74	10	12	RF-0700	153		17.8			27	11.0	0.4	1.5	14.6
74	10	12	RF-0900	83		14.9			17	11.8	0.8	1.5	13.6
74	10	12	RF-1100	143		25.7			19	18.4	2.3	1.5	[illegible]
74	10	12	RF1300	373		31.6			27	19.6	0.0	0.0	24.3
74	10	12	RF-1500	440		34.8			34	24.9	0.0	0.0	27.7
74	10	12	RF-1700	481		36.7			51	21.4	0.0	0.0	24.5
74	10	12	RF-1900	411		34.6			60	24.9	0.0	0.0	27.1
74	10	12	RF-2100	349		33.1			48	22.1	0.0	0.0	24.7
74	10	12	RF-2300	311		29.1			25	19.4	0.0	0.0	21.8
74	11	12	RF-0100	353		28.7			35	16.6	0.0	0.0	20.1
74	11	12	RF-0300	336		28.3			22	18.9	0.8	2.1	20.4
74	11	12	RF-0500						20	15.3	1.8	2.6	16.9
74	11	12	RAW FEED SAMPLE MISSING AT 0700 DUE TO SAMPLER MALFUNCTION										
74	11	12	RF-0830	162		19.8			17	10.7	1.7	3.3	12.8
74	11	12	RF-0900	266		26.6			17	14.2	0.2	1.5	15.5
74	11	12	RF-1100	362		41.2			19	26.0	0.1	0.4	27.9
74	11	12	RF-1300	625		51.3			39	27.6	0.1	0.4	29.6
74	11	12	RF-1500	600		48.5			44	29.7	0.0	0.0	32.4
74	11	12	RF-1700	458		36.4			48	24.4	0.0	0.0	26.4

ANALYSES

YEAR	DAY	MON	SAMPLE DESIGNATION	UNFILTERED COD	UNFILTERED BOD	UNFILTERED TKN	FILTERED COD	FILTERED BOD	FILTERED FOC	FILTERED NH3N	FILTERED NO2N	FILTERED NO3N	FILTERED TKN
74	11	12	RF-1900	456		30.7			68	24.0	0.2	0.9	25.1
74	11	12	RF-2100	486		28.1			74	25.1	0.0	0.1	26.0
74	11	12	RF-2300	328		32.3			42	24.0	0.0	0.0	25.8
74	12	12	RF-0100	296		30.2			32	27.4	0.0	0.1	28.1
74	12	12	RF-0300	250		34.1			30	23.9	0.0	0.0	25.7
74	12	12	RF-0500	190		26.6			23	19.9	0.2	1.2	22.2
74	12	12	RF-0700	168		24.6			27	18.0	0.4	1.5	19.7
74	12	12	RF-0800	191		17.5			17	10.1	0.4	1.7	12.0
74	12	12	RF-0900	61		16.5			28	12.4	0.4	1.2	14.2
74	12	12	RF-1200	382		38.8			57	28.7	0.0	0.0	29.0
74	12	12	RF-1300	242		33.3			37	26.1	0.0	0.0	27.8
74	12	12	RF-1600	318		32.5			57	22.1	0.0	0.0	23.4
74	12	12	RF-1700	392		30.9			60	22.3	0.0	0.0	23.7
74	12	12	RF-2100	404		37.0			78	26.9	0.0	0.0	28.8
74	13	12	RF-0100	186		22.6			39	18.0	0.0	0.0	19.3
74	13	12	RF-0500	298		24.7			21	13.5	0.3	1.2	14.6
74	13	12	RF-0900	276		23.0			14	12.5	0.0	1.4	13.7
74	17	12	RF-0900	212		19.5	46			6.4	0.1	1.9	9.0
74	13	12	RF-1300	316		35.1			28	23.9	0.0	0.0	25.1
74	13	12	RF-1700	[illegible]		34.3			44	21.1	0.0	0.0	24.0
74	13	12	RF-2100	575		44.6			64	29.9	0.0	0.0	32.0
74	14	12	RF-0100	395		36.1			21	18.7	0.0	0.0	20.3
74	14	12	RF-0500	254		28.6			21	16.1	0.0	0.0	17.8
74	14	12	RF-0800	450		32.0			14	13.1	0.0	0.6	14.4
74	17	12	RF-1000	406		31.9	61			16.8	0.0	2.0	19.5
74	17	12	RF-1100	388		36.7	53			23.9	0.0	1.1	25.3
74	17	12	RF-1200	396		40.9	102			28.1	0.0	0.0	29.2
74	17	12	RF-1300	640		49.8	116			26.9	0.0	0.0	28.0
74	17	12	RF-1400	645		50.2	112			28.3	0.0	0.0	29.5
74	17	12	RF-1500	870		61.3	154			32.1	0.0	0.0	34.0
74	17	12	RF-1600	950		71.4	190			33.8	0.0	0.0	35.6
74	17	12	RF-1700	705		51.3	139			26.5	0.0	0.0	27.8
74	17	12	RF-1800	685		50.1	128			26.3	0.0	0.0	27.4
74	17	12	RF-1900	535		47.8	90			21.6	0.0	0.0	24.0
74	17	12	RF-2000	560		46.6	142			27.3	0.0	0.0	28.9
74	17	12	RF-2100	595		46.1	161			29.7	0.0	0.1	31.6
74	17	12	RF-2200	490		46.0	130			26.1	0.0	0.0	27.9
74	17	12	RF-2300	450		38.5	104			21.9	0.0	0.0	23.0
74	17	12	RF-2400	460		39.2	89			21.4	0.0	0.0	22.5
74	18	12	RF-0100	426		36.5	75			19.7	0.0	0.0	21.9
74	18	12	RF-0200	420		33.5	74			21.7	0.0	0.3	22.3
74	18	12	RF-0300	356		32.3	68			19.7	0.2	1.2	21.0
74	18	12	RF-0400	400		40.0	59			16.7	0.3	2.0	19.6
74	18	12	RF-0500	358		32.7	48			14.9	0.0	1.4	15.8
74	18	12	RF-0600	362		32.4	54			13.6	0.4	3.1	14.8
74	18	12	RF-0700	356		29.9	53			12.4	0.6	3.7	13.4
74	18	12	RF-0800	78		19.1	51			12.0	0.7	4.6	13.5
74	18	12	RF-1000	814		36.1	50			19.1	0.3	2.4	20.6

ANALYSES

YEAR	DAY	MON	SAMPLE DESIGNATION	UNFILTERED COD	UNFILTERED BOD	UNFILTERED TKN	FILTERED COD	FILTERED BOD	FILTERED FOC	FILTERED NH3N	FILTERED NO2N	FILTERED NO3N	FILTERED TKN
74	18	12	RF-1200	326		37.9	360			26.0	0.0	0.0	29.9
74	18	12	RF-1400	528		43.8	109			26.4	0.0	0.0	27.8
74	18	12	RF-1600	710		51.5	191			29.5	0.0	0.0	31.3
74	18	12	RF-1800	585		50.5	166			28.8	0.0	0.0	23.8
74	18	12	RF-2000	645		47.6	172			28.0	0.0	0.0	29.1
74	18	12	RF-2200	595		45.1	125			23.1	0.0	0.0	24.6
74	18	12	RF-2400	504		33.5	45			19.0	0.0	0.0	20.6
74	19	12	RF-0200	416		37.1	114			22.7	0.0	0.0	24.0
74	19	12	RF-0400	370		33.3	76			18.9	0.0	0.0	20.5
74	19	12	RF-0600	368		33.1	56			15.1	0.1	1.1	16.6
74	19	12	RF-0800	304		25.1	53			13.0	0.1	2.0	13.1
74	19	12	RF-0900	490		25.7	60			17.8	0.0	2.0	18.4
74	19	12	RF-1200	292		29.9	69			17.0	0.0	0.7	22.2
74	19	12	RF-1500	430		34.0	110			19.0	0.0	0.1	27.3
74	19	12	RF-1800	374		30.9	151			21.0	0.0	0.0	26.0
74	19	12	RF-2100	560		30.2	128			16.0	0.0	0.2	23.5
74	19	12	RF-2400	725		39.2	135			15.0	0.0	0.0	22.5
74	20	12	RF-0300	630		40.2	95			15.0	0.0	0.0	21.7
74	20	12	RF-0600	590		35.4	188			13.0	0.0	0.0	17.4
74	20	12	RF-0900	344		25.4	64			12.5	0.0	0.9	13.4
74	20	12	RF-1200	398		28.3	86			25.0	0.0	0.0	28.2
74	20	12	RF-1500	755		48.3	155			24.0	0.0	0.0	30.1
74	20	12	RF-1800	635		42.5	214			20.0	0.0	0.0	27.7
74	20	12	RF-2100	905		56.3	177			21.0	0.0	0.4	27.4
74	20	12	RF-2400	730		45.2	114			17.0	0.0	0.1	21.5
74	21	12	RF-0300	625		43.0	86			18.0	0.0	0.0	21.2
74	21	12	RF-0600	675		42.0	66			15.0	0.0	0.6	16.9
75	28	01	RF-0900	186		17.3	94		18	9.7	0.4	4.5	12.6
75	28	01	RF-1000	212		24.1	132		24	15.0	0.4	1.5	21.7
75	28	01	RF-1100	300		31.8	127		28	16.0	0.2	0.9	24.5
75	28	01	RF-1200	335		35.3	149		36	19.0	0.3	1.0	28.5
75	28	01	RF-1300	410		40.0	100		40	75.0	0.4	0.5	29.7
75	28	01	RF-1400	470		42.2	145		54	24.0	0.0	0.1	32.8
75	28	01	RF-1500	512		43.6	155		105	25.0	0.0	0.2	31.6
75	28	01	RF-1600	436		36.7	129		54	21.0	0.0	0.0	29.1
75	28	01	RF-1700	412		35.3	110		45	21.0	0.0	0.0	27.3
75	28	01	RF-1800	468		37.8	89		49	14.0	0.3	1.3	26.7
75	28	01	RF-1900	402		40.8	115		66	19.0	0.0	0.3	28.1
75	28	01	RF-2000	492		39.7	174		73	20.0	0.0	0.1	30.3
75	28	01	RF-2100	502		40.3	204		69	20.0	0.0	0.0	30.8
75	28	01	RF-2200	422		36.0	145		60	20.0	0.0	0.0	29.6
75	28	01	RF-2300	386		33.3	118		44	18.0	0.6	0.4	25.9
75	28	01	RF-2400	322		30.5	107		37	10.0	0.0	0.2	23.4
75	29	01	RF-0100	308		27.5	121		101	15.0	0.0	0.1	23.5
75	29	01	RF-0200	332		27.4	137		59	16.0	0.0	0.2	22.5
75	29	01	RF-0300	386		25.6	94		32	16.0	0.0	0.2	20.6
75	29	01	RF-0400	270		24.3	73		33	15.0	0.0	0.2	19.7
75	29	01	RF-0500	232		21.3	67		25	11.0	0.1	0.4	17.2

ANALYSES

YEAR	DAY	MON	SAMPLE DESIGNATION	UNFILTERED COD	UNFILTERED BOD	UNFILTERED TKN	FILTERED COD	FILTERED BOD	FILTERED FOC	FILTERED NH3N	FILTERED NO2N	FILTERED NO3N	FILTERED TKN
75	29	01	RF-0600	264		18.0	62		23	14.0	0.4	0.8	14.0
75	29	01	RF-0700	160		15.6	63		21	10.2	0.4	1.1	12.4
75	29	01	RF-0800	176		15.0	53		31	9.6	0.3	1.3	12.5
75	29	01	RF-0900	198		17.0	56		28	9.8	0.3	1.1	12.5
75	29	01	RF-1000	250		19.6	52		19	11.5	0.3	0.9	14.1
75	29	01	RF-1100	212		21.6	55		22	13.5	0.3	0.8	16.7
75	29	01	RF-1200	288		27.5	73		27	16.0	0.3	0.5	20.7
75	29	01	RF-1300	384		29.8	95		27	16.0	0.3	0.4	20.6
75	29	01	RF-1400	344		24.8	110		37	14.0	0.4	0.6	17.9
75	29	01	RF-1700	370		20.9	87		51	12.8	0.6	4.4	18.8
75	29	01	RF-1800	382		26.6	103		58	12.9	0.5	3.8	21.4
75	29	01	RF-1900	356		27.0	127		58	13.3	0.3	3.4	22.0
75	29	01	RF-2000	322		28.6	79		41	13.0	0.4	3.2	17.4
75	29	01	RF-2100	232		23.2	72		43	13.3	0.4	3.3	17.2
75	29	01	RF-2200	272		25.4	83		38	12.3	0.4	3.2	17.6
75	29	01	RF-2300	282		23.3	81		43	10.9	0.4	2.8	16.0
75	29	01	RF-2400	264		23.7	80		43	9.7	0.3	3.1	17.[illegible]
75	30	01	RF-0100	270		23.1	60		42	11.5	0.4	2.7	18.0
75	30	01	RF-0200	272		23.2	47		31	13.0	0.3	1.8	17.3
75	30	01	RF-0300	204		19.7	72		30	13.9	0.8	2.3	17.2
75	30	01	RF-0400	192		18.9	76		27	13.3	0.4	1.5	16.5
75	30	01	RF-0500	198		17.2	71		28	12.0	0.3	1.4	14.6
75	30	01	RF-0600	166		14.6	75		22	10.6	0.3	1.7	13.4
75	30	01	RF-0700	122		12.0	65		22	9.0	0.3	1.6	11.2
75	10	02	RF-C	615	192	42.5	79	28	29	17.0	3.2	3.9	24.6
75	20	02	RF-C	332	97	41.4	84	40	42	36.0	0.6	23.4	35.0
75	26	02	RF-C	245	68	40.4	82	20	24	31.0	0.4		35.1
75	26/02/75 ANALYTICAL ERROR, NO NITRATE RESULT												
75	03	03	RF-C	366	94	26.5	75	24	30	15.0	0.3	7.8	19.1
75	04	03	RF-C	368	94	29.7	75	28	31	14.0	0.5	2.3	20.3
75	05	03	RF-C	400	111	29.3	105	32	32	16.0	0.4	1.1	20.2
75	06	03	RF-C	384	157	31.1	59	[illegible]	30	17.0	0.5	0.4	21.[illegible]
75	07	03	RF-C	414	114	33.9	69	31	20	16.[illegible]	0.3	[illegible].7	21.2
75	03	03	RF-0900				98			11.1	1.0	13.6	11.1
75	03	03	RF-1000	SAMPLE MISSED DUE TO AUTO SAMPLE ERROR									
75	03	03	RF-1200				72			23.0	0.1	0.9	25.3
75	03	03	RF-1500				126			19.0	0.0	0.1	24.2
75	03	03	RF-1800				158			17.6	0.0	0.1	23.8
75	03	03	RF2100				106			15.0	0.6	7.9	20.1
75	03	03	FF2400				82			13.0	0.6	7.9	17.2
75	04	03	RF-0300				72			13.0	0.5	7.8	17.[illegible]
75	04	03	RF-0600				102			9.0	0.6	3.2	10.8
75	04	03	RF-0900				38			10.9	0.4	1.6	11.2
75	04	03	RF-1200				75			20.0	0.3	1.2	23.1
75	04	03	RF-1500				83			21.0	0.7	1.9	24.2
75	04	03	RF-1800				83			15.0	0.7	2.2	23.1
75	04	03	RF-2100				104			16.0	0.4	1.5	[illegible]
75	04	03	RF-2400				68			15.0	0.8	2.9	18.4

ANALYSES

YEAR	DAY	MON	SAMPLE DESIGNATION	UNFILTERED COD	UNFILTERED BOD	UNFILTERED TKN	FILTERED COD	FILTERED BOD	FILTERED FOC	FILTERED NH3N	FILTERED NO2N	FILTERED NO3N	FILTERED TKN
75	05	03	RF-0300				53			15.0	0.5	1.9	18.3
75	05	03	RF-0600				43			10.6	0.5	2.2	11.6
75	05	03	RF-0900				47			11.2	0.5	1.5	12.7
75	05	03	RF-1200				47			18.0	0.2	0.9	22.2
75	05	03	RF-1500				93			21.0	0.0	0.1	27.6
75	05	03	RF-1800				195			15.0	0.3	0.9	21.0
75	05	03	RF-2100				150			18.0	0.5	1.2	26.6
75	05	03	RF-2400				77			14.0	0.4	1.4	19.1
75	06	03	RF-0300				101			13.5	0.4	1.3	19.4
75	06	03	RF-0600				57			9.8	0.5	1.6	12.8
75	06	03	RF-0900				40			9.0	0.3	3.1	11.9
75	06	03	RF-1200				47			21.0	0.3	0.3	25.8
75	06	03	RF-1500				89			22.0	2.0	1.2	27.9
75	06	03	RF-1800				95			21.0	0.9	0.1	22.7
75	06	03	RF-2100				83			17.0	0.8	0.1	20.9
75	06	03	RF-2400				73			14.0	0.3	0.0	18.1
75	07	03	RF-0300				61			15.0	0.4	0.3	18.4
75	07	03	RF-0600				55			8.0	0.5	0.8	14.5
75	07	03	RF-0900				50			10.0	0.2	1.6	11.3
75	07	03	RF-1200				48			22.0	0.2	0.2	24.4
75	07	03	RF-1500				90			23.0	0.0	0.0	28.0
75	07	03	RF-1800				114			15.0	0.6	2.4	23.7
75	07	03	RF-2100				98			19.0	0.3	1.1	24.7
75	07	03	RF-2400				67			15.0	0.4	0.4	19.2
75	08	03	RF-0300				56			14.0	0.3	0.2	18.1
75	08	03	RF-0600				45			13.3	0.4	0.6	15.2
75	11	03	RF-C	448	102	34.5	67	38	32	20.0	0.8	2.0	20.7
75	12	03	RF-C	504	129	35.1	108	24	30	13.2	0.1	1.7	20.6
75	13	03	RF-C	252	21	25.9	78	16	31	14.0	0.0	0.7	18.8
75	14	03	RF-C	360	129	25.2	75	35	32	19.0	0.5	2.2	21.4
75	15	03	RF-C	338	82	21.4	63	13	20	14.8	0.3	0.8	17.7
75	16	03	RF-C	334	82	18.9	51	13	20	13.7	0.1	0.8	15.5
75	17	03	RF-C	436	139	19.3	63	26	30	14.7	0.3	1.9	16.2
75	18	03	RF-C	302	88	17.2	6[illegible]	26	28	12.9	0.8	2.1	14.4
75	11	03	RF-0900				47			10.9	0.0	2.7	14.0
75	11	03	RF-1200				45			12.6	0.0	0.8	25.5
75	11	03	RF-1500				94			25.0	0.0	0.2	28.3
75	11	03	RF-1800				120			20.0	0.0	0.0	23.8
75	11	03	RF-2100				98			25.0	0.0	0.0	28.0
75	11	03	RF-2400				53			18.0	0.0	0.0	19.0
75	12	03	RF-0300				43			16.0	0.0	0.1	18.7
75	12	03	RF-0600				35			11.1	0.2		12.0
75	12	03	RF-0900				69			11.3	0.0	2.7	16.1
75	12	03	RF-1200				86			17.0	0.0	1.5	28.6
75	12	03	RF-1500				121			20.0	0.7	3.8	30.5
75	12	03	RF-1800				109			13.0	0.7	1.4	23.7
75	12	03	RF-2100				118			12.2	0.6	1.2	21.8
75	12	03	RF-2400				86			12.5	0.3	1.0	18.9

ANALYSES

YEAR	DAY	MON	SAMPLE DESIGNATION	UNFILTERED COD	UNFILTERED BOD	UNFILTERED TKN	FILTERED COD	FILTERED 300	FILTERED FOC	FILTERED NH3N	FILTERED NO2N	FILTERED NO3N	FILTERED TKN
75	13	03	RF-0300				69			11.3	0.0	1.3	17.4
75	13	03	RF-0600				54			9.4	0.0	2.0	13.5
75	13	03	RF-0900				38			6.2	0.1	1.1	8.2
75	13	03	RF-1200				37			18.1	0.0	0.2	21.4
75	13	03	RF-1500				72			20.0	0.0	0.0	22.5
75	13	03	RF-1800				87			18.1	0.0	0.0	20.0
75	13	03	RF-2100				82			17.0	0.0	0.0	18.9
75	13	03	RF-2400				48			12.0	0.0	0.1	15.0
75	14	03	RF-0300				43			13.5	0.1	0.5	15.5
75	14	03	RF-0600				38			10.8	0.1	1.2	12.6
75	14	03	RF-0900				52			7.6	0.2	0.7	10.1
75	14	03	RF-1200				75			26.0	0.0	0.1	29.3
75	14	03	RF-1500				87			26.0	0.0	0.1	29.0
75	14	03	RF-1800				127			22.0	0.0	0.2	25.0
75	14	03	RF-2100				79			19.0	0.0	0.0	21.7
75	14	03	RF-2400				96			16.0	0.0	0.6	18.9
75	15	03	RF-0300				52			14.1	0.0	0.4	18.3
75	15	03	RF-0600				47			12.7	0.3	0.9	13.9
75	15	03	RF-0900				46			9.3	0.1	0.8	11.7
75	15	03	RF-1200				54			17.0	0.0	0.5	19.3
75	15	03	RF-1500				72			20.0	0.0	0.0	24.0
75	15	03	RF-1800				72			14.0	0.0	0.0	16.5
75	15	03	RF-2100				62			13.2	0.0	0.0	15.1
75	15	03	RF-2400				62			13.7	0.0	0.0	16.2
75	16	03	RF-0300				55			13.0	0.0	0.0	15.[illegible]
75	16	03	RF-0600				55			13.0	0.3	1.3	15.9
75	16	03	RF-0900				38			9.0	0.2	2.1	12.7
75	16	03	RF-1200				45			17.0	0.1	1.1	19.3
75	16	03	RF-1500				56			21.0	0.0	[illegible]	24.1
75	16	03	RF-1800				69			15.0	0.0	0.0	18.0
75	16	03	RF-2100				57			12.4	0.0	0.0	13.3
75	16	03	RF-2400				58			13.1	0.0	0.0	13.[illegible]
75	17	03	RF-0300				55			13.0	0.0	0.0	15.2
75	17	03	RF-0600				48			10.3	0.0	0.0	10.6
75	17	03	RF-0900				47			10.3	0.3	1.5	17.[illegible]
75	17	03	RF-1200				56			25.0	0.0	0.0	29.0
75	17	03	RF-1500				104			23.0	0.0	0.0	25.6
75	17	03	RF-1800				103			17.0	0.0	0.0	19.9
75	17	03	RF-2100				63			[illegible]	0.0	0.0	15.5
75	17	03	RF-2400				49			11.4	0.1	0.5	13.7
75	18	03	RF-0300				49			11.1	0.6	2.4	12.8
75	18	03	RF-0600				42			7.1	0.7	3.7	10.1
75	18	03	RF-0900				47			7.1	0.9	4.7	9.3
75	18	03	RF-1200				52			18.0	0.3	0.0	21.2
75	18	03	RF-1500				134			12.7	0.9	2.3	14.7
75	18	03	RF-1800				95			13.3	1.5	2.4	15.1
75	18	03	RF-2100				89			17.0	0.4	0.2	19.6
75	18	03	RF-2400				57			11.9	0.5	0.5	13.6

ANALYSES

YEAR	DAY	MON	SAMPLE DESIGNATION	UNFILTERED COD	UNFILTERED BOD	UNFILTERED TKN	FILTERED COD	FILTERED BOD	FILTERED FOC	FILTERED NH3N	FILTERED NO2N	FILTERED NO3N	FILTERED TKN
75	19	03	RF-0300				52			11.2	0.4	2.0	13.6
75	19	03	RF-0600				41			7.4	0.5	3.6	9.9
75	24	03	RF-C	130	49	10.3	37	8	22	8.3	0.5	2.0	8.4
75	25	03	RF-C	178	55	11.2	45	14	17	9.3	0.7	1.7	10.1
75	26	03	RF-C	220	67	14.1	45	13	19	11.7	0.7	1.6	12.1
75	27	03	RF-C	246	134	23.0	47	14	20	12.6	0.5	1.2	13.4
75	24	03	RF-0900				37			5.7	0.7	2.1	5.7
75	24	03	RF-1200				44			15.0	0.6	0.7	15.7
75	24	03	RF-1500				39			10.7	0.2	0.3	10.3
75	24	03	RF-1800				47			9.1	0.8	0.7	9.1
75	24	03	RF-2100				35			7.2	0.8	1.7	7.2
75	24	03	RF-2400				34			6.9	0.6	3.0	7.1
75	25	03	RF-0300				28			7.7	0.5	2.8	7.8
75	25	03	RF-0600				25			4.3	0.4	3.1	4.3
75	25	03	RF-0900				31			3.0	0.3	3.4	4.1
75	25	03	RF-1200				55			17.0	0.5	1.6	17.2
75	25	03	RF-1500				62			15.0	1.5	0.7	[illegible]
75	25	03	RF-1800				60			10.6	1.0	0.8	11.1
75	25	03	RF-2100				46			8.6	0.9	1.7	9.6
75	25	03	RF-2400				44			8.4	0.6	1.2	9.0
75	26	03	RF-0300				39			9.1	0.4	1.7	9.3
75	26	03	RF-0600				34			5.5	0.3	2.3	6.2
75	26	03	RF-0900				32			4.5	0.3	3.7	5.5
75	26	03	RF-1200				44			14.0	2.6	5.0	14.5
75	26	03	RF-1500				61			17.0	0.6	0.3	17.1
75	26	03	RF-1800				58			14.0	0.7	0.3	14.2
75	26	03	RF-2100				50			11.9	0.6	0.6	12.2
75	26	03	RF-2400				43			11.5	0.5	0.9	12.0
75	27	03	RF-0300				39			11.0	0.8	[illegible]	11.3
75	27	03	RF-0600				[illegible]			6.8	[illegible]	[illegible]	[illegible]
75	27	03	RF-0900				[illegible]			5.0	0.4	2.4	[illegible]
75	27	03	RF-1200				[illegible]			14.0	0.5	[illegible]	16.0
75	27	03	RF-1500				62			21.0	[illegible]	[illegible]	21.1
75	27	03	RF-1800				66			18.0	3.5	[illegible]	18.0
75	27	03	RF-2100				60			11.8	0.8	0.6	13.2
75	27	03	RF-2400				53			10.7	0.9	3.6	12.1
75	28	03	RF-0300				49			11.8	0.8	1.8	13.0
75	28	03	RF-0600				41			10.4	0.5	1.8	11.4
75	07	04	RF-C	232	68	20.9	60	13	21	11.6	0.5	2.1	15.2
75	08	04	RF-C	294	76	29.6	79	27	30	19.8	0.5	2.3	20.8
75	09	04	RF-C	314	100	24.3	67	21	31	14.2	0.5	1.0	16.5
75	10	04	RF-C	211	86	24.1	47	22	29	17.0	0.2	1.9	18.2
75	07	04	RF-0900				65			8.0	0.4	2.7	3.4
75	07	04	RF-1200				61			18.9	0.4	1.5	21.6
75	07	04	RF-1500				98			18.5	0.0	0.4	20.0

ANALYSES

YEAR	DAY	MON	SAMPLE DESIGNATION	UNFILTERED COD	UNFILTERED BOD	UNFILTERED TKN	FILTERED COD	FILTERED BOD	FILTERED FOC	FILTERED NH3N	FILTERED NO2N	FILTERED NO3N	FILTERED TKN
75	07	04	RF-1800				70			12.1	0.3	0.5	15.0
75	07	04	RF-2100				74			12.1	0.9	2.4	15.6
75	07	04	RF-2400				57			11.6	0.8	1.5	14.5
75	08	04	RF-0300				48			10.5	0.4	2.0	12.6
75	08	04	RF-0600				40			6.9	0.3	3.1	8.0
75	08	04	RF-0900				36			6.7	0.6	5.5	7.4
75	08	04	RF-1200				78			42.5	0.1	0.2	46.3
75	08	04	RF-1500				143			36.9	0.0	0.1	40.7
75	08	04	RF-1800				153			34.1	0.0	0.1	36.5
75	08	04	RF-2100				63			13.3	0.6	1.2	20.2
75	08	04	RF-2400				65			11.5	0.7	1.8	14.1
75	09	04	RF-0300				46			11.3	0.5	2.2	13.7
75	09	04	RF-0600				42			8.5	0.5	2.7	9.9
75	09	04	RF-0900				36			6.0	0.3	2.7	6.7
75	09	04	RF-1200				58			21.0	0.0	0.2	21.4
75	09	04	RF-1500				88			19.9	0.1	0.3	19.9
75	09	04	RF-1800				86			13.8	1.3	1.7	15.1
75	09	04	RF-2100				123			20.8	0.3	0.3	22.6
75	09	04	RF-2400				42			12.9	0.3	0.2	16.2
75	10	04	RF-0300				57			11.8	0.5	0.6	14.7
75	10	04	RF-0600				37			9.8	0.5	1.6	11.0
75	10	04	RF-0900				47			6.2	0.3	2.5	7.6
75	10	04	RF-1200				59			23.0	1.0	0.7	24.5
75	10	04	RF-1500				92			20.0	0.1	0.2	25.6
75	10	04	RF-1800				90			17.0	0.0	0.1	21.3
75	10	04	RF-2100				116			22.0	0.0	0.1	27.2
75	10	04	RF-2400				60			13.0	0.1	0.1	13.3
75	11	04	RF-0300				52			12.2	0.6	0.6	18.0
75	11	04	RF-0600				47			10.2	0.4	1.7	14.0
75	15	04	RF-C	402	92	33.0	138	53	51	14.8	0.1	0.4	15.7
75	16	04	NO UNF COD RESULTS FOR COMPOSITE 24 HOUR SAMPLE DUE TO ANALYTICAL ERROR										
75	16	04	RF-C		106	29.2	54	28	37	24.0	0.3	0.5	25.3
75	17	04	RF-C	324	85	24.6	62	59	41	11.3	0.1	1.2	14.6
75	18	04	RF-11TO2200	772	52	23.3	53	13	21	15.3	0.1	1.9	15.8
75	18	04	RF-C				56	12	18	16.0	0.5	0.6	20.2
75	19	04	RF-C	290	117	16.7	54	42	37	6.5	0.0	0.2	10.0
75	20	04	RF-C	332	87	16.0	86	46	44	4.2	0.0	0.0	8.3
75	21	04	RF-C	324	70	39.8	51	14	14	26.0	0.2	0.9	30.1
75	22	04	RF-C	334	62	32.9	53	9	15	21.0	0.4	1.5	24.0
75	23	04	RF-C	274	65	15.1	51	23	26	9.8	0.3	1.5	13.0
75	24	04	RF-C	322	81	21.7	50	29	35	12.6	0.2	0.8	13.2
75	15	04	RF-1100				42		28	20.0	0.0	0.4	22.2
75	15	04	RF-1300				80		29	21.0	0.0	0.0	23.1
75	15	04	RF-1500				111		47	24.0	0.0	0.0	25.6
75	15	04	RF-1700				132		52	21.0	0.0	0.0	22.7
75	15	04	RF-1900				148		54	19.0	0.0	0.0	20.4
75	15	04	RF-2100				148		57	23.0	0.0	0.0	24.9
75	15	04	RF-2300				112		47	19.0	0.0	0.0	20.7

ANALYSES

YEAR	DAY	MON	SAMPLE DESIGNATION	UNFILTERED COD	UNFILTERED BOD	UNFILTERED TKN	FILTERED COD	FILTERED BOD	FOC	NH3N	NO2N	NO3N	TKN
75	16	04	RF-0100				148		76	12.1	0.0	0.0	13.3
75	16	04	RF-0300				130		62	11.8	0.0	0.0	12.7
75	16	04	RF-0500				78		55	10.6	0.0	0.0	11.4
75	16	04	RF-0700				122		58	7.5	0.0	0.0	9.0
75	16	04	RF-0900				148		59	7.1	0.0	0.0	8.8
75	16	04	RF-1100				62		39	13.7	0.1	0.5	15.1
75	16	04	RF-1300				73		37	22.0	0.0	0.0	23.9
75	16	04	RF-1500				160		57	23.0	0.0	0.0	24.3
75	16	04	RF-1700				226		71	21.0	0.0	0.0	22.5
75	16	04	RF-1900				153		30	21.0	0.5	0.4	21.9
75	16	04	RF-2100				192		63	20.0	0.9	0.5	20.9
75	16	04	RF-2300				80		29	20.0	0.0	0.1	21.6
75	17	04	RF-0100				102		36	31.0	0.2	0.1	35.1
75	17	04	RF-0300				77		28	32.0	0.5	0.3	33.9
75	17	04	RF-0500				69		27	26.0	0.5	0.6	28.7
75	17	04	RF-0700				78		18	25.0	0.5	0.9	27.2
75	17	04	RF-0900				72		18	33.0	0.5	0.9	35.5
75	17	04	RF-1100				48		12	32.0	0.9	0.7	37.8
75	17	04	RF-1300				30		12	11.7	0.1	0.2	14.3
75	17	04	RF-1500				49		18	12.1	0.4	0.0	14.6
75	17	04	RF-1700				49		17	8.8	0.1	0.0	11.2
75	17	04	RF-1900				54		25	11.4	0.6	0.0	12.9
75	17	04	RF-2100				55		25	12.1	0.6	0.0	14.1
75	17	04	RF-2300				66		25	11.0	0.5	0.0	16.4
75	18	04	RF-0100				119		68	10.6	0.1	0.0	18.4
75	18	04	RF-0300				100		65	9.8	0.0	0.0	16.1
75	18	04	RF-0500				91		69	6.1	0.0	0.0	13.9
75	18	04	RF-0700				69		77	3.8	0.0	0.0	9.9
75	18	04	RF-0900				118		85	1.6	0.0	0.0	8.8
75	18	04	RF-1100				49		13	17.0	0.3	0.0	19.5
75	18	04	RF-1300				45		17	12.4	0.1	0.0	14.5
75	18	04	RF-1500				76		30	13.4	0.0	0.0	17.3
75	18	04	RF-1700				71		30	10.6	0.0	0.0	14.0
75	18	04	RF-1900				75		31	11.2	0.0	0.0	14.4
75	18	04	RF-2100				60		25	12.0	0.5	0.1	14.0
75	18	04	RF-2300				40		17	13.4	1.3	0.2	13.5
75	19	04	RF-0100				76		29	24.0	0.1	0.0	23.3
75	19	04	RF-0300				56		19	20.0	0.7	0.1	25.4
75	19	04	RF-0500				47		13	16.0	0.5	1.0	22.3
75	19	04	RF-0700				40		15	15.0	0.5	1.8	18.9
75	19	04	RF-0900				43		10	18.0	0.6	[illegible]	25.1
75	19	04	RF-1100				39		9	19.0	0.7	2.3	22.4
75	19	04	RF-1400				45		24	5.5	0.1	0.2	7.0
75	19	04	RF-1700				49		28	3.4	0.0	0.0	5.3
75	19	04	RF-2000				62		28	2.8	0.0	0.0	4.9
75	19	04	RF-2300				62		29	3.7	0.0	0.0	6.0
75	20	04	RF-0200				67		41	8.3	0.0	0.0	12.1
75	20	04	RF-0500				68		46	7.5	0.0	0.0	12.1

ANALYSES

YEAR	DAY	MON	SAMPLE DESIGNATION	UNFILTERED COD	UNFILTERED BOD	UNFILTERED TKN	FILTERED COD	FILTERED BOD	FILTERED FOC	FILTERED NH3N	FILTERED NO2N	FILTERED NO3N	FILTERED TKN
75	20	04	RF-0800				67		53	4.9	0.0	0.0	8.9
75	20	04	RF-1100				57		40	1.7	0.0	0.5	2.0
75	20	04	RF-1400				68		44	4.0	0.0	0.0	4.0
75	20	04	RF-1700				73		44	2.2	0.0	0.0	6.7
75	20	04	RF-2000				70		44	0.7	0.0	0.0	5.6
75	20	04	RF-2300				85		52	2.5	0.0	0.0	4.2
75	21	04	RF-0200				98		52	9.3	0.0	0.0	10.2
75	21	04	RF-0500				79		42	6.9	0.5	0.0	14.8
75	21	04	RF-0800				105		56	1.6	0.0	0.0	11.6
75	21	04	RF-1100				52		27	14.0	0.1	1.9	16.9
75	21	04	RF-1400				62		24	27.0	0.0	0.3	30.9
75	21	04	RF-1500				52		16	23.0	0.0	0.0	26.0
75	21	04	RF-2000				54		19	26.0	0.2	0.6	27.7
75	21	04	RF-2300				44		14	21.0	0.1	0.3	22.4
75	22	04	RF-0200				58		19	27.0	0.1	0.0	29.8
75	22	04	RF-0500				48		14	26.0	0.4	1.3	28.4
75	22	04	RF-0800				45		13	26.0	0.5	2.5	29.1
75	22	04	RF-1100				49		10	30.0	0.5	2.6	33.1
75	22	04	RF-1400				61		16	29.0	0.1	0.5	32.0
75	22	04	RF-1700				43		13	18.0	0.3	0.9	19.2
75	22	04	RF-2000				42		13	25.0	0.6	1.1	30.0
75	22	04	RF-2300				50		15	27.0	0.3	0.7	31.5
75	23	04	RF-0200				63		17	14.0	0.4	0.5	16.5
75	23	04	RF-0500				54		16	12.9	0.6	1.3	14.5
75	23	04	RF-0800				45		15	11.9	0.5	2.5	13.4
75	23	04	RF-1100				36		13	30.0	0.4	2.0	13.0
75	23	04	RF-1300				45		30	10.5	0.0	0.3	12.4
75	23	04	RF-1500				62		34	9.2	0.0	0.0	11.9
75	23	04	RF-1700				71		42	7.3	0.0	0.0	10.5
75	23	04	RF-1900				97		47	6.0	0.0	0.0	12.0
75	23	04	RF-2100				77		47	6.2	0.0	0.0	10.2
75	23	04	RF-2300				72		43	6.7	0.0	0.0	10.8
75	24	04	RF-0100				60		24	13.7	0.9	1.9	17.7
75	24	04	RF-0300				49		19	13.1	0.5	1.4	15.9
75	24	04	RF-0500				56		19	11.6	0.4	2.5	16.2
75	24	04	RF-0700				39		16	8.8	0.5	3.0	10.9
75	24	04	RF-0900				43		16	6.8	0.4	3.5	11.1
75	24	04	RF-1100				65		18	19.9	0.5	1.6	22.7
75	24	04	RF-1300				47		24	16.6	0.0	0.4	18.7
75	24	04	RF-1500				46		20	12.4	0.0	0.1	14.2
75	24	04	RF-1700				53		27	12.7	0.1	0.1	13.9
75	24	04	RF-1900				51		36	12.6	0.3	0.4	13.6
75	24	04	RF-2100				51		23	10.6	0.3	0.6	11.6
75	24	04	RF-2300				41		17	8.6	0.3	0.9	10.4
75	25	04	RF-0100				65		47	12.6	0.1	0.1	15.9
75	25	04	RF-0300				22		46	12.9	0.0	0.4	15.7
75	25	04	RF-0500				53		42	11.6	0.1	0.1	14.5
75	25	04	RF-0700				59		35	7.2	0.5	1.4	[illegible]

ANALYSES

YEAR	DAY	MON	SAMPLE DESIGNATION	UNFILTERED COD	UNFILTERED BOD	UNFILTERED TKN	FILTERED COD	FILTERED BOD	FILTERED FOC	FILTERED NH3N	FILTERED NO2N	FILTERED NO3N	FILTERED TKN
75	25	04	RF-0900				53		38	7.2	0.9	1.9	9.8
75			FOLLOWING ARE THE 2 HR RESULTS FROM 19/4 1100HRS TO 23/4 1100 HRS AS										
75			INTERPRETED FROM A CONTINUOUS RECORD DURING THIS PERIOD BASED ON 3 HR										
75			SAMPLES										
75	19	04	RF-1100				39		9	19.0	0.7	2.3	22.4
75	19	04	RF-1300				43		18	10.0	0.3	1.0	12.0
75	19	04	RF-1500				46		27	5.0	0.0	0.1	6.5
75	19	04	RF-1700				49		28	3.4	0.0	0.0	5.3
75	19	04	RF-1900				58		28	3.0	0.0	0.0	4.0
75	19	04	RF-2100				62		28	3.0	0.0	0.0	5.5
75	19	04	RF-2300				62		29	3.7	0.0	0.0	5.0
75	20	04	RF-0100				66		37	7.0	0.0	0.0	9.0
75	20	04	RF-0300				68		43	8.0	0.0	0.0	12.0
75	20	04	RF-0500				68		46	7.5	0.0	0.0	12.1
75	20	04	RF-0700				68		50	5.5	0.0	0.0	10.0
75	20	04	RF-0900				64		46	3.0	0.0	0.0	5.0
75	20	04	RF-1100				57		40	1.7	0.0	0.5	2.0
75	20	04	RF-1300				65		43	3.5	0.0	0.0	7.5
75	20	04	RF-1500				70		44	3.5	0.0	0.0	5.0
75	20	04	RF-1700				73		44	2.2	0.0	0.0	5.7
75	20	04	RF-1900				71		44	1.0	0.0	0.0	5.0
75	20	04	RF-2100				75		47	1.5	0.0	0.0	5.0
75	20	04	RF-2300				85		52	2.5	0.0	0.0	4.2
75	21	04	RF-0100				94		52	8.0	0.0	0.0	8.0
75	21	04	RF-0300				91		48	6.5	0.1	0.0	12.0
75	21	04	RF-0500				70		42	6.9	0.5	0.0	14.8
75	21	04	RF-0700				100		52	3.0	0.1	0.0	12.0
75	21	04	RF-0900				80		40	7.0	0.0	0.5	13.5
75	21	04	RF-1100				52		27	14.0	0.1	1.3	16.5
75	21	04	RF-1300				50		25	22.0	0.1	0.5	25.5
75	21	04	RF-1500				52		16	23.0	0.1	0.0	26.0
75	21	04	RF-1700				59		22	25.5	0.0	0.0	29.0
75	21	04	RF-1900				57		18	25.0	0.0	0.5	27.0
75	21	04	RF-2100				50		16	24.5	0.1	0.5	25.0
75	21	04	RF-2300				44		14	21.0	0.1	0.3	22.4
75	22	04	RF-0100				56		17	26.0	0.1	0.0	28.0
75	22	04	RF-0300				55		16	26.5	0.2	0.5	29.5
75	22	04	RF-0500				48		14	26.0	0.4	1.3	25.4
75	22	04	RF-0700				46		13	26.5	0.4	2.0	29.0
75	22	04	RF-0900				46		12	27.5	0.5	2.5	31.0
75	22	04	RF-1100				49		10	30.0	0.5	2.6	33.1
75	22	04	RF-1300				57		14	29.0	0.2	1.0	32.5
75	22	04	RF-1500				56		15	26.0	0.2	0.5	27.0
75	22	04	RF-1700				43		13	18.0	0.3	0.9	19.2
75	22	04	RF-1900				42		13	22.0	0.5	1.0	26.0
75	22	04	RF-2100				45		14	27.0	0.5	1.0	30.5
75	22	04	RF-2300				55		15	27.0	0.3	0.7	31.5
75	23	04	RF-0100				59		16	18.5	0.4	0.5	21.5

ANALYSES

SAMPLE				UNFILTERED			FILTERED						
YEAR	DAY	MON	DESIGNATION	COD	BOD	TKN	COD	BOD	FOC	NH3N	NO2N	NO3N	TKN
75	23	04	RF-0300				58		16	13.5	0.5	1.0	16.0
75	23	04	RF-0500				54		16	12.9	0.6	1.3	14.5
75	23	04	RF-0700				47		15	12.0	0.5	2.0	13.5
75	23	04	RF-0900				40		14	18.0	0.4	2.5	20.0
75	23	04	RF-1100				36		13	11.0	0.4	2.0	13.0
75			END OF INTERPRETED RECORD										
75	05	05	RF-C	344	93	69.7	66	26	29	45.0	0.2	1.1	55.1
75	07	05	RF-C	264	64	59.3	71	18	27	44.0	0.1	0.4	52.5
75	12	05	RF-C	344	114	32.3	71	38	31	23.8	0.1	0.7	25.3
75	13	05	RF-C	344	112	33.4	76	33	10	21.1	0.1	1.1	23.1
75	14	05	RF-C	302	93	25.2	82	27	26	19.0	0.1	0.8	21.3
75	15	05	RF-C	416	108	35.1	150	39	39	23.9	0.1	0.3	26.7
75	12	05	RF-0900				38		14	10.6	0.2	1.4	13.0
75	12	05	RF-1200				41		14	21.9	0.1	0.2	24.1
75	12	05	RF-1500				84		35	28.8	0.1	0.1	31.5
75	12	05	RF-1800				138		52	27.9	0.3	0.2	30.3
75	12	05	RF-2100				118		56	25.8	0.0	0.0	27.1
75	12	05	RF-2400				52		55	26.7	0.0	0.0	28.1
75	13	05	RF-0300				61		25	19.6	0.0	0.0	21.4
75	13	05	RF-0600				53		19	18.1	0.2	0.1	19.8
75	13	05	RF-0900				50		9	11.7	0.1	0.7	15.2
75	13	05	RF-1200				43		12	21.7	0.1	0.1	23.9
75	13	05	RF-1500				150		32	34.0	0.0	0.0	35.0
75	13	05	RF-1800				92		24	21.9	0.0	0.0	22.6
75	13	05	RF-2100				178		30	29.0	0.0	0.0	30.5
75	13	05	RF-2400				81		21	18.9	0.0	0.0	19.7
75	14	05	RF-0300				53		15	17.9	0.0	0.0	18.9
75	14	05	RF-0600				38		12	11.5	0.4	0.2	14.8
75	14	05	RF-0900				40		90	12.0	0.0	0.0	14.7
75	14	05	RF-1200				50		18	21.0	0.0	0.0	22.9
75	14	05	RF-1500				116		26	24.0	0.0	0.1	26.3
75	14	05	RF-1800				125		26	15.0	0.0	0.0	18.7
75	14	05	RF-2100				166		39	23.0	0.0	0.0	25.2
75	14	05	RF-2400				71		19	17.0	0.0	0.1	19.4
75	15	05	RF-0300				52		14	15.0	0.0	0.0	17.6
75	15	05	RF-0600				54		11	12.4	0.5	0.5	13.9
75	15	05	RF-0900				48		17	12.5	0.3	0.6	19.4
75	15	05	RF-1200				56		22	24.9	0.1	0.1	27.4
75	15	05	RF-1500				52		66	35.0	0.0	0.0	37.3
75	15	05	RF-1800				71		44	21.7	0.0	0.0	23.4
75	15	05	RF-2100				124		70	28.9	0.0	0.0	31.1
75	15	05	RF-2400				67		31	20.0	0.0	0.0	21.2
75	16	05	RF-0300				64		29	19.0	0.0	0.0	22.1
75	16	05	RF-0600				55		17	12.4	0.3	0.6	15.1
75	26	05	RF-C	336	106	30.2	82	38	45	21.6	0.1	0.7	23.7
75	27	05	RF-C	446	157	33.5	151	100	73	13.6	0.2	2.4	22.8
75	28	05	RF-C	464	163	17.6	99	78	65	13.0	0.0	0.0	15.7
75	29	05	RF-C	358	120	32.3	156	71	54	18.6	0.0	0.0	20.3

ANALYSES

			SAMPLE	UNFILTERED			FILTERED						
YEAR	DAY	MON	DESIGNATION	COD	BOD	TKN	COD	BOD	FOC	NH3N	NO2N	NO3N	TKN
75	26	05	RF-0900				56		22	10.2	0.3	3.1	15.9
75	26	05	RF-1200				54		19	26.2	0.2	0.7	27.3
75	26	05	RF-1500				98		50	29.0	0.0	0.0	30.6
75	26	05	RF-1800				129		54	22.2	0.0	0.0	24.3
75	26	05	RF-2100				135		63	23.9	0.0	0.0	25.4
75	26	05	RF-2400				73		37	18.6	0.1	0.4	19.3
75	27	05	RF-0300				70		33	17.4	0.1	0.4	18.7
75	27	05	RF-0600				67		28	14.7	0.1	0.2	16.1
75	27	05	RF-0900				48		18	10.6	0.1	2.4	14.9
75	27	05	RF-1200				86		49	19.6	0.0	0.0	24.4
75	27	05	RF-1500				161		78	23.9	0.0	0.0	29.5
75	27	05	RF-1800				178		85	14.4	0.0	0.0	24.5
75	27	05	RF-2100				261		109	27.7	1.0	2.2	31.1
75	27	05	RF-2400				258		78	12.5	0.1	0.4	22.8
75	28	05	RF-0300				131		73	12.3	0.0	0.0	21.6
75	28	05	RF-0600				106		63	9.3	0.0	0.0	18.1
75	28	05	RF-0900				72		62	5.6	0.1	1.3	7.1
75	28	05	RF-1200				70		49	18.0	0.0	0.2	20.0
75	28	05	RF-1500				126		74	18.0	0.1	0.5	19.7
75	28	05	RF-1800				125		82	15.0	0.0	0.0	18.1
75	28	05	RF-2100				135		78	13.0	0.0	0.0	14.9
75	28	05	RF-2400				117		74	13.1	0.0	0.0	15.0
75	29	05	RF-0300				104		69	12.5	0.0	0.0	14.8
75	29	05	RF-0600				95		63	9.9	0.0	0.0	11.7
75	29	05	RF-0900				66		63	4.9	0.1	1.5	7.8
75	29	05	RF-1200				61		51	20.7	0.0	0.0	22.6
75	29	05	RF-1500				86		63	23.9	0.0	0.0	25.0
75	29	05	RF-1800				100		71	19.8	0.0	0.0	21.1
75	29	05	RF-2100				156		92	22.2	0.0	0.0	24.7
75	29	05	RF-2400				107		72	18.5	0.0	0.0	19.4
75	30	05	RF-0300				74		67	16.9	0.0	0.0	17.8
75	30	05	RF-0600				52		26	13.3	0.1	0.2	15.3
75	02	06	RF-C	296	102	26.4	66	39	35	19.1	0.0	0.4	20.9
75	03	06	RF-C	287	87	51.5	74	40	43	41.0	0.1	0.5	42.8
75	04	05	RF-C	162	91	57.3	62	28	33	48.0	0.5	5.6	55.3
75	05	06	RF-C	277	106	40.2	40	35	37	37.0	0.1	0.4	38.2
75	02	06	RF-0900				45		24	11.6	0.0	0.0	13.8
75	02	06	RF-1200				44		17	12.1	0.0	0.0	23.4
75	02	06	RF-1500				82		46	26.9	0.0	0.0	30.1
75	02	06	RF-1800				103		55	21.7	0.0	0.0	24.6
75	02	06	RF-2100				79		46	19.8	0.0	0.0	21.1
75	02	06	RF-2400				68		36	17.6	0.0	0.0	18.3
75	03	06	RF-0300				57		39	15.9	0.0	0.0	17.7
75	03	06	RF-0600				43		23	12.8	0.0	0.0	15.0
75	03	06	RF-0900	(INTERPRETED)									13.5
75	03	06	RF-1200				55		22	38.0	0.2	4.1	39.7
75	03	06	RF-1500				102		55	46.0	0.0	0.0	48.9
75	03	06	RF-1800				98		57	46.8	0.0	0.0	48.4
75	03	06	RF-2100				122		65	48.1	0.0	0.0	49.3

ANALYSES

			SAMPLE	UNFILTERED			FILTERED						
YEAR	DAY	MON	DESIGNATION	COD	BOD	TKN	COD	BOD	FOC	NH3N	NO2N	NO3N	TKN
75	03	06	RF-2400				97		59	45.0	0.0	0.0	45.5
75	04	06	RF-0300				59		28	38.6	0.0	0.0	40.7
75	04	06	RF-0600				51		22	37.5	0.0	0.0	38.5
75	04	06	RF-0900				40		15	33.0	0.5	4.9	35.1
75	04	06	RF-1200				33		16	37.0	0.0	0.0	40.0
75	04	06	RF-1500				58		41	36.0	0.0	0.0	46.2
75	04	06	RF-1800				73		55	53.0	0.0	0.0	54.0
75	04	06	RF-2100				99		62	42.0	0.8	3.6	45.6
75	04	06	RF-2400				47		34	40.0	0.1	0.1	41.4
75	05	06	RF-0300				40		25	40.0	0.0	0.0	41.7
75	05	06	RF-0600				44		20	37.0	0.0	0.0	38.8
75	05	06	RF-0900				40		16	37.0	0.0	0.0	40.0
75	05	06	RF-1300				44		20	36.0	0.0	0.0	38.3
75	05	06	RF-1500				68		43	44.0	0.0	0.0	45.9
75	05	06	RF-1800				49		56	39.0	0.0	0.0	39.9
75	05	06	RF-2100				52		52	38.0	0.0	0.0	39.9
75	05	06	RF-2400				56		44	38.0	0.0	0.0	40.3
75	06	06	RF-0300				32		34	35.0	0.0	0.0	37.3
75	06	06	RF-0600				28		24	15.0	0.0	0.0	17.9
75	20	06	RF-C	332	94	59.7	61	22	38	48.8	0.1	0.1	52.1
75	01	07	RF-C	324	122	28.7	78	26	33	19.4	0.1	0.4	21.7
75	02	07	RF-C	338	137	38.0	96	61	41	28.0	0.0	0.0	29.4
75	03	07	RF-C	256	67	27.5	83	31	34	18.0	0.0	0.0	24.0
75	01	07	RF-0900				58		23	13.3	0.3	0.6	17.2
75	01	07	RF-1100				106		41	11.9	0.3	0.2	15.9
75	01	07	RF-1300				71		26	18.8	0.3	0.6	20.2
75	01	07	RF-1500				95		38	26.9	0.0	0.0	28.5
75	01	07	RF-1700				118		49	31.0	0.0	0.0	33.8
75	01	07	RF-1900				116		53	[illegible]	0.0	0.0	31.6
75	01	07	RF-2100				98		47	23.0	0.0	0.0	25.8
75	01	07	RF-2300				81		37	21.0	0.0	0.0	22.0
75	02	07	RF-0100				79		37	19.0	0.0	0.0	22.1
75	02	07	RF-0300				68		32	20.0	0.0	0.0	21.1
75	02	07	RF-0500				56		25	18.5	0.2	0.2	20.3
75	02	07	RF-0700				48		21	13.7	0.3	0.3	16.4
75	02	07	RF-0900				59		16	13.1	0.0	0.0	14.7
75	02	07	RF-1100				65		27	28.0	0.0	0.0	30.6
75	02	07	RF-1300				72		31	36.0	0.0	0.0	38.3
75	02	07	RF-1500				124		63	44.0	0.0	0.0	47.4
75	02	07	RF-1700				170		74	45.0	0.0	0.0	48.8
75	02	07	RF-1900				201		41	46.0	0.0	0.0	48.3
75	02	07	RF-2100				138		56	26.0	0.0	0.0	28.8
75	02	07	RF-2300				97		41	18.0	0.0	0.0	20.6
75	03	07	RF-0100				83		36	16.0	0.0	0.0	17.8
75	03	07	RF-0300				75		32	16.0	0.0	0.0	16.7
75	03	07	RF-0500				70		32	16.0	0.0	0.0	17.2
75	03	07	RF-0700				72		35	17.0	0.0	0.0	18.5
75	03	07	RF-0900				96		47	24.0	0.6	2.4	2[illegible].5

ANALYSES

YEAR	DAY	MON	SAMPLE DESIGNATION	UNFILTERED COD	UNFILTERED BOD	UNFILTERED TKN	FILTERED COD	FILTERED BOD	FILTERED FOC	FILTERED NH3N	FILTERED NO2N	FILTERED NO3N	FILTERED TKN
75	03	07	RF-1100				60		23	19.6	0.1	0.1	21.7
75	03	07	RF-1300				59		22	22.0	0.0	0.0	24.7
75	03	07	RF-1500				73		37	25.0	0.0	0.0	27.9
75	03	07	RF-1700				120		72	30.0	0.0	0.0	32.5
75	03	07	RF-1900				160		66	28.0	0.0	0.0	29.4
75	03	07	RF-2100				122		50	22.0	0.0	0.0	24.0
75	03	07	RF-2300				82		43	19.0	0.0	0.0	21.1
75	04	07	RF-0100				74		36	17.1	0.0	0.0	18.5
75	04	07	RF-0300				96		40	17.9	0.0	0.0	19.1
75	04	07	RF-0500				67		32	17.2	0.0	0.0	18.9
75	04	07	RF-0700				56		24	11.8	0.0	0.0	13.9
73	27	11	EA1-GAM				27.8		11	10.3	0.2	2.9	10.3
73	27	11	EA1-GPM				31.2		17	15.4	0.2	1.8	15.4
73	29	11	EA1-GAM				40.8		9	6.7	0.3	3.3	6.7
73	27	11	EA2-C	299.0	59	19.4	41.3	14	19	12.3	0.4	2.0	12.3
73	27	11	MLA2-GAM			175.0							
73	29	11	EA1-GPM				43.9		16	13.5	0.5	4.5	13.5
73	29	11	MLA1-GAM			243.0							
73	29	11	EA2-C	127.0	135	10.0	46.0	1[illegible]	19	9.2	0.7	4.1	9.2
73	29	11	MLA2-GAM			186.0							
74	11	02	MLA1-GAM			204.0							
74	11	02	MLA2-GAM			230.0							
74	11	02	EA2-C	78.0	11	10.6	79.0	6	45	8.6	1.2	5.4	8.6
74	13	02	MLA1-GAM			218.0							
74	13	02	MLA2-GAM			228.0							
74	13	02	EA2-C	217	25	11.5	100	16	6	6.4	1.1	8.3	6.4
74	19	02	MLA2-GAM			152.0							
74	19	02	MLA1-GAM			134.0							
74	19	02	EA2-C	153	17	18.7	99	9	9	15.1	0.8	2.8	15.1
74	21	02	MLA2-GAM			189.0							
74	21	02	MLA1-GAM			205.0							
74	21	02	EA2-C	31	13	8.7	61	4	7	6.4	2.3	5.5	6.4
74	27	02	MLA1-GAM			198.0							
74	27	02	MLA2-GAM			178.0							
74	27	02	EA2-C	72	6	4.1	47	3	7	2.8	3.5	11.6	2.9
74	01	03	MLA1-GAM			188.0							
74	01	03	MLA2-GAM			195.0							
74	01	03	EA2-C	59	8	9.8	48	4	13	8.1	4.1	15.9	8.1
74	04	03	MLA1-0900			156.0							
74	04	03	MLA2-0900			157.0							
74	04	03	EA2-0900	53		2.0	39			0.2	0.1	9.0	1.1
74	04	03	EA2-C1				56			0.6	0.8	10.1	1.0
74	04	03	EA2-C2				59			2.2	2.0	11.5	2.6
74	04	03	EA2-C3				71			3.3	1.3	10.9	3.4
74	04	03	EA2-C4				74			3.8	1.0	9.4	4.2
74	05	03	EA2-C5				50			1.9	1.0	9.1	2.2
74	05	03	EA2-C6				50			0.1	0.1	8.4	0.8
74	04	03	EA2-C	87		5.7							

ANALYSES

YEAR	DAY	MON	SAMPLE DESIGNATION	UNFILTERED COD	UNFILTERED BOD	UNFILTERED TKN	FILTERED COD	FILTERED BOD	FILTERED FOC	FILTERED NH3N	FILTERED NO2N	FILTERED NO3N	FILTERED TKN
74	05	03	EA2-CC1				28			3.5	2.1	5.9	3.8
74	05	03	EA2-CC2				41			5.9	3.7	4.4	5.9
74	06	03	EA2-CC3				46			6.9	3.0	3.2	6.9
74	05	03	EA2-C	80		8.9							
74	06	03	MLA1-GAM			163.0							
74	06	03	MLA2-GAM			135.0							
74	06	03	EA2-CC1				38			7.5	2.4	3.3	7.5
74	06	03	EA2-CC2				47			8.3	2.2	2.4	8.3
74	07	03	EA2-CC3				37			8.2	1.4	2.3	8.2
74	06	03	EA2-C	93		11.6							
74	07	03	EA2-CC1				48			13.2	0.4	1.3	13.2
74	07	03	EA2-CC2				57			14.0	0.6	1.6	14.0
74	08	03	EA2-CC3				52			10.9	0.5	2.7	11.0
74	07	03	MLA2-GAM			164.0							
74	07	03	EA2-C	204		19.4							
74	07	03	MLA1-GAM			126.0							
74	15	03	MLA1-GAM			176.0							
74	15	03	MLA2-GAM			149.0							
74	15	03	EA2-C	83.0	15	10.7	37.3	3	20	9.2	1.0	8.5	9.2
74	25	03	MLA1-GAM			188.0							
74	25	03	MLA2-GAM			180.0							
74	25	03	EA2-C	115	20	13.2	33	4	16	12.6	1.0	13.9	12.6
74	03	04	MLA1-GAM			200.0							
74	03	04	MLA2-GAM			233.0							
74	03	04	EA2-C	74	16	16.3	45	5	11	15.6	0.7	15.7	15.6
74	05	04	MLA1-GAM			171.0							
74	05	04	MLA2-GAM			202.0							
74	05	04	EA2-C	49	14	8.9	29	4	6	7.2	0.5	11.0	7.2
74	NO EA2-C6, C7, C8 DUE TO SAMPLER ERROR (09/04/74),EA2-C REPRESENTS A COMPOSITE												
74	SAMPLE FROM C1 TO C5 INCLUSIVE. IT IS NOT A 24 HR COMPOSITE.												
74	ALL COD ANALYSES ON 09 + 10/04/74 QUESTIONABLE DUE TO ANALYTICAL ERROR												
74	09	04	MLA1-0900			246.0							
74	09	04	MLA2-0900			201.0							
74	09	04	MLA1-1500			233.0							
74	09	04	MLA2-1500			220.0							
74	09	04	EA2-C1	63	5	1.1	37	4	8	1.0	0.2	12.2	1.9
74	09	04	EA2-C2	53	6	1.7	24	3	6	1.9	2.1	13.0	2.8
74	09	04	EA2-C3	65	10	6.7	41	4	9	5.3	3.1	25.0	5.3
74	09	04	EA2-C4	49	6	7.6	41	4	10	7.0	3.4	24.0	7.0
74	09	04	EA2-C5	53	6	8.0	37	4	10	7.4	3.4	26.0	7.4
74	09	04	EA2-C	53	9	5.3	37	4	8	5.2	2.3	20.0	5.2
74	10	04	MLA1-0900			199.0							
74	10	04	MLA2-0900			192.0							
74	10	04	MLA1-1500			225.0							
74	10	04	MLA2-1500			227.0							
74	10	04	EA2-C1	41	7	3.4	41	3	19	6.9	0.3	27.7	2.3
74	10	04	EA2-C2	41	6	4.6	33	2	22	2.3	0.5	28.5	3.3
74	10	04	EA2-C3	41	6	6.4	33	3	8	4.9	3.7	21.3	5.5

ANALYSES

			SAMPLE	UNFILTERED			FILTERED						
YEAR	DAY	MON	DESIGNATION	COD	BOD	TKN	COD	BOD	FOC	NH3N	NO2N	NO3N	TKN
74	10	04	EA2-C4	53	7	5.7	29	3	10	4.3	2.9	26.1	5.1
74	10	04	EA2-C5	41	6	4.3	25	2	10	2.7	2.6	27.4	4.3
74	11	04	EA2-C6	49	6	4.2	33	2	11	2.8	2.7	26.3	4.2
74	11	04	EA2-C7	45	5	4.5	29	2	11	2.9	3.1	20.9	4.5
74	11	04	EA2-C8	45	5	3.1	20	2	8	1.4	1.9	26.1	3.1
74	10	04	EA2-C	45	6	4.7	29	3	9	3.2	2.6	25.4	4.7
74	16	04	MLA1-GAM			257.0							
74	16	04	MLA2-GAM			229.0							
74	16	04	EA2-C	52	11	3.4	36	4	11	3.1	0.5	3.7	3.4
74	18	04	MLA1-GAM			260.0							
74	18	04	MLA2-GAM			257.0							
74	18	04	EA2-C	48	6	11.7	32	3	10	10.4	0.3	8.6	10.4
74	21	05	MLA1-GAM			153.0							
74	21	05	MLA2-GAM			180.0							
74	21	05	EA2-C	50	13	8.8	33	7	10	8.0	1.4	11.3	8.1
74	23	05	MLA1-GAM			209.0							
74	23	05	MLA2-GAM			234.0							
74	23	05	FA2-C	62	14	11.7	55	6	18	14.3	0.4	2.0	14.3
74	18	06	MLA1-GAM			290.0							
74	18	06	MLA2-GAM			296.0							
74	18	06	EA2-C	46	6	4.1	27	3	11	3.3	0.5	18.0	3.3
74	20	06	EA2-C	46	7	2.0	25	4	10	1.0	0.5	15.5	1.3
74	26	06	EA2-C	36	5	5.3	44	4	5	3.6	1.5	19.5	3.6
74	26	06	MLA1-GAM			321.0							
74	26	06	MLA2-GAM			299.0							
74	28	06	MLA2-GAM			293.0							
74	28	06	MLA1-GAM			238.0							
74	28	06	EA2-C	66	7	4.2	37	4	13	3.3	4.5	27.5	3.3
74	10	07	EA2-C	70	8	8.8	51	6	18	8.8	0.3	5.1	8.8
74	10	07	MLA1-GAM			248.0							
74	10	07	MLA2-GAM			231.0							
74	12	07	EA2-C	79	7	10.7	34	5	16	7.7	0.2	4.7	7.7
74	12	07	MLA1-GAM			280.0							
74	12	07	MLA2-GAM			280.0							
74	22	07	EA2-C	38	9	9.1	34	7	14	6.7	1.7	11.3	8.0
74	22	07	MLA1-GAM			303.0							
74	22	07	MLA2-GAM			322.0							
74	30	07	EA2-C	33	6	7.9	25	5	10	7.0	0.5	28.5	7.6
74	30	07	MLA1-GAM			312.0							
74	30	07	MLA2-GAM			252.0							
74	06	08	EA2-C	60	9	[illegible]	16	4	10	1.6	0.4	25.1	3.9
74	06	08	MLA1-GAM			333.0							
74	06	08	MLA2-GAM			275.0							
74	08	08	EA2-C	108	13	8.0	16	5	12	3.5	0.2	33.8	3.9
74	08	08	MLA1-GAM			266.0							
74	08	08	MLA2-GAM			289.0							
74	09	08	EA2-0800				32			0.9	0.2	30.3	1.8
74	17	09	EA2-C	44	58	14.1	31	4	12	12.0	0.8	24.7	14.8

ANALYSES

			SAMPLE	UNFILTERED			FILTERED						
YEAR	DAY	MON	DESIGNATION	COD	BOD	TKN	COD	BOD	FOC	NH3N	NO2N	NO3N	TKN
74	17	09	MLA1-GAM			306.0							
74	17	09	MLA2-GAM			302.0							
74	19	09	EA2-C	45	5	12.5	37	53	12	10.7	0.5	31.0	11.9
74	19	09	MLA1-GAM			280.0							
74	19	09	MLA2-GAM			270.0							
74	25	09	EA2-C	43	5	10.3	34	4	15	7.9	0.8	28.7	9.0
74	25	09	MLA1-GPM			291.0							
74	25	09	MLA2-GPM			203.0							
74	27	09	EA2-C	51	7	15.6	38	4	15	11.0	0.4	30.6	12.0
74	27	09	MLA1-GPM			304.0							
74	27	09	MLA2-GPM			278.0							
74	18	10	EA2-C	94	10	21.5	52	4	17	18.0	1.5	23.5	18.3
74	18	10	MLA1-GAM			310.0							
74	18	10	MLA2-GAM			336.0							
74	25	10	EA2-C	55	7	8.0	38	4	20	5.6	0.5	30.5	6.0
74	25	10	MLA1-GAM			378.0							
74	25	10	MLA2-GAM			423.0							
74	06	11	EA2-C	33	6	3.5	33	3	13	1.0	0.0	39.0	2.1
74	06	11	MLA1-GAM			315.0							
74	06	11	MLA2-GAM			362.0							
74	13	11	EA2-C	58	7	7.2	33	3	13	5.6	0.5	46.5	6.0
74	13	11	MLA1-GAM			290.0							
74	13	11	MLA2-GAM			323.0							
74	25	11	EA2-C	25	4	6.0	25	3	8	5.6	0.5	25.0	5.6
74	25	11	MLA1-GAM			282.0							
74	25	11	MLA2-GAM			287.0							
75	20	02	EA2-C	62	6	15.1	55	6	18	12.5	0.8	31.2	14.2
75	20	02	MLA1-GAM			362.0							
75	20	02	MLA2-GAM			189.0							
75	07	05	EA2-C	88	10	3.5	49	6	14	1.3	1.0	36.0	2.7
75	07	05	MLA1-GAM			81.0							
75	07	05	MLA2-GAM			121.0							
75	20	06	EA2-C	54	13	6.1	43	3	14	1.9	2.8	65.2	4.3
75	20	06	MLA2-GAM			203.0							
75	20	06	MLA1-GAM			269.0							
73	09	11	EA-0900	120.0		14.5	34.6			12.4	1.2	11.8	12.8
73	09	11	EA-1200				36.5			14.3	1.0	9.6	14.3
73	09	11	EA-1500	175.0		24.2	45.8			21.0	0.5	4.1	21.0
73	09	11	MLA-0900			216.0							
73	09	11	MLA-1500			217.0							
73	10	11	EA-1045				51.3			16.3	1.9	18.1	16.9
73	11	11	EA-1100				41.3			17.4	0.3	2.8	17.4
73	14	11	EA-C	129.0		16.3	50.9		16	16.1	1.[illegible]	10.1	15.1
73	14	11	MLA-GAM			172.0							
73	15	11	EA-C	141.0	50	13.9	48.6	10	16	11.4	0.2	2.3	11.4
73	15	11	MLA-GAM			186.3							
73	19	11	EA-C				50.9	17	25	12.8	0.5	10.5	12.8
73	19	11	MLA-GAM			215.0							

ANALYSES

YEAR	DAY	MON	SAMPLE DESIGNATION	UNFILTERED COD	UNFILTERED BOD	UNFILTERED TKN	FILTERED COD	FILTERED BOD	FILTERED FOC	FILTERED NH3N	FILTERED NO2N	FILTERED NO3N	FILTERED TKN
73	20	11	EA-C	193.0		16.7	46.7		16	13.4	0.2	3.9	13.4
73	20	11	EA-GAM	124.0	43	12.5							
73	20	11	MLA-GPM			232.0							
73	21	11	EA-C	178.0		17.7	41.3		18	13.7	0.1	2.6	13.7
73	21	11	MLA			230.0							
74	28	01	EA-GAM	48.2		6.0	31.8			5.2	0.2	4.1	5.3
74	29	01	EA-C	61.8	13	11.7	39.3	6	7	10.0	0.2	0.9	10.0
74	29	01	MLA-GAM			189.0							
74	31	01	MLA-0900			194.0							
74	31	01	MLA-1500			198.0							
74	31	01	MLA-1800			228.0							
74	31	01	MLA-2100			214.0							
74	31	01	EA-C1	65.5	16	8.8	39.8	8	6	7.9	0.3	2.4	7.9
74	31	01	EA-C2	59.0	19	11.1	33.1	5	5	10.0	0.4	3.3	10.0
74	31	01	EA-C3	62.2	15	12.4	38.2	16	6	11.5	0.5	3.3	11.5
74	31	01	EA-C4	63.2	45	12.6	40.3	11	40	11.7	0.7	2.4	11.7
74	31	01	EA-C5	56.7	14	13.1	40.0	23	17	11.6	0.2	2.4	11.6
74	01	02	EA-C6	859.5	323	49.5	39.7	19	9	12.7	0.5	1.8	12.7
74	01	02	EA-GAM	896.6	319	53.5	30.8	9	5	9.9	0.2	3.5	9.9
74	31	01	EA-C	133.9	91	26.0	32.4	3	5	10.9	0.3	1.6	10.9
74	04	02	EA-C1	82.6	17	10.1	32.1	7	10	8.6	0.4	2.9	8.6
74	04	02	EA-C2	62.0	11	12.4	28.9	4	7	11.0	0.4	3.0	11.0
74	04	02	EA-C3	66.1	11	15.8	24.8	3	9	14.4	0.3	2.5	14.4
74	04	02	EA-C4	90.9	15	16.1	28.9	5	11	13.7	0.3	2.0	13.7
74	04	02	EA-C5	74.4	14	15.1	37.2	4	13	13.4	0.4	1.5	13.4
74	05	02	EA-C6	82.6	13	14.9	37.2	3	12	13.3	0.3	1.3	13.3
74	05	02	EA-C7	74.4	11	14.6	41.3	4	12	12.5	0.3	1.2	12.5
74	05	02	EA-C8	74.4	14	12.9	52.0	6	10	10.6	0.3	1.8	10.6
74	04	02	EA-C	69.0	18	14.2	40.0	7	8	12.1	0.3	2.4	12.1
74	04	02	MLA-0900			191.0							
74	04	02	MLA-1500			207.0							
74	05	02	MLA-0900			217.0							
74	05	02	EA-C1				48.0			8.2	0.5	2.0	8.2
74	05	02	EA-C2				45.0			10.7	0.5	2.9	10.7
74	05	02	EA-C3				45.0			13.5	0.5	2.3	13.5
74	05	02	EA-C4				49.0			13.7	0.4	1.8	13.7
74	05	02	EA-C5				52.0			14.2	0.4	1.5	14.2
74	05	02	EA-C6				52.0			13.7	0.3	1.3	13.7
74	06	02	EA-C7				47.0			13.5	0.3	1.3	13.5
74	06	02	EA-C8				48.0			11.0	0.4	2.4	11.0
74	05	02	EA-C				45.0			10.9	0.4	2.3	10.9
74	23	04	EA-C	44	7	2.5	36	4	11	2.3	1.0	12.9	2.3
74	23	04	MLA-GAM			247.0							
74	25	04	EA-C	52	9	6.6	32	6	9	4.8	1.5	13.8	5.4
74	25	04	MLA-GAM			275.0							
74	30	04	EA-C1	52	7	2.6	32	3	9	0.2	0.7	18.3	1.8
74	30	04	EA-C2	48	6	2.8	36	3	9	0.5	2.7	25.8	2.2
74	30	04	EA-C3	52	6	4.5	36	3	10	1.1	3.0	32.0	3.6

ANALYSES

YEAR	DAY	MON	SAMPLE DESIGNATION	UNFILTERED COD	UNFILTERED BOD	UNFILTERED TKN	FILTERED COD	FILTERED BOD	FILTERED FOC	FILTERED NH3N	FILTERED NO2N	FILTERED NO3N	FILTERED TKN
74	30	04	EA-C4	56	2	5.8	36	3	9	1.4	2.4	32.6	4.7
74	30	04	EA-C5	60	5	6.3	40	3	10	1.4	2.2	34.3	5.2
74	01	05	EA-C6	60	6	6.8	36	4	9	1.7	1.9	35.6	5.6
74	01	05	EA-C7	56	7	6.3	36	2	9	2.1	1.7	35.6	5.2
74	01	05	EA-C8	56	6	6.3	36	2	9	1.8	1.1	37.4	5.1
74	30	04	EA-C	24	7	5.1	47	3	10	1.2	2.0	33.0	4.5
74	30	04	MLA-0900			214.0							
74	30	04	MLA-1500			191.0							
74	01	05	EA-C9	55	6	6.7	30	3	9	1.0	1.0	28.5	6.7
74	01	05	EA-C10	67	5	11.9	37	2	9	11.5	1.0	34.5	11.5
74	01	05	EA-C11	63	7	18.1	37	2	10	17.4	1.0	35.5	17.4
74	01	05	EA-C12	90	8	19.8	37	2	13	16.4	1.0	37.0	16.4
74	01	05	EA-C13	74	9	18.1	37	2	11	14.8	1.5	36.0	14.8
74	02	05	EA-C14	86	9	17.9	56	2	11	14.6	1.5	34.0	14.6
74	02	05	EA-C15	86	13	21.8	49	2	10	18.7	4.0	23.0	18.7
74	02	05	EA-C16	67	14	16.5	41	2	10	16.5	3.0	29.0	16.5
74	01	05	EA-C	67	9	17.8	34	4	10	16.5	2.0	29.5	17.4
74	01	05	MLA-0900			225.0							
74	01	05	MLA-1500			227.0							
74	14	05	MLA-GAM			179.0							
74	14	05	EA-C	45	13	11.2	28	3	6	9.6	1.0	22.0	9.6
74	16	05	EA-C	46	8	7.5	17	4	6	6.5	1.5	22.0	6.5
74	16	05	MLA-GAM			221.0							
74	04	06	MLA-GAM			219.0							
74	04	06	EA-C	56	8	13.6	39	5	18	13.0	0.5	5.9	13.0
74	06	06	MLA-GAM			249.0							
74	06	06	EA-C	70	12	18.6	46	6	17	18.3	0.6	5.5	18.3
74	13	06	MLA-GAM			308.0							
74	13	06	EA-C	42	4	16.6	44	4	10	15.1	1.4	11.6	15.1
74	02	07	EA-C	46	6	1.9	33	5	8	1.8	1.0	23.5	1.8
74	02	07	MLA-GAM			189.0							
74	05	07	MLA-GPM			288.0							
74	05	07	EA-C	38	7	3.3	30	6	12	3.0	0.5	22.5	3.0
74	16	07	EA-C	55	7	12.7	38	6	14	9.8	2.2	12.2	11.0
74	16	07	MLA-GAM			201.0							
74	18	07	EA-C	55	7	6.3	38	3	12	4.9	1.0	17.0	6.1
74	18	07	MLA-GAM			258.0							
74	13	08	EA-(0900-1700)	28	4	7.1	20	6	10	5.8	0.4	30.1	6.6
74	13	08	MLA-GAM			262.0							
74	15	08	EA-C	37	5	8.5	29	4	10	6.2	0.2	29.3	7.0
74	15	08	MLA-GAM			219.0							
74	20	08	EA-C	29	6	2.8	25	7	11	1.4	0.8	15.7	2.1
74	20	08	MLA-GAM			218.0							
74	22	08	EA-C	41	15	9.2	25	6	13	6.7	2.7	14.8	8.0
74	22	08	MLA-GAM			276.0							
74	06	09	EA-C	41	35	15.0	33	4	11	13.7	0.8	31.2	14.1
74	06	09	MLA-GAM			288.0							
74	10	09	EA-C	65	6	16.8	33	5	14	14.0	0.2	28.8	14.7

ANALYSES

YEAR	DAY	MON	SAMPLE DESIGNATION	UNFILTERED COD	UNFILTERED BOD	UNFILTERED TKN	FILTERED COD	FILTERED BOD	FILTERED FOC	FILTERED NH3N	FILTERED NO2N	FILTERED NO3N	FILTERED TKN
74	12	09	MLA-GAM			309.0							
74	12	09	EA-09-2300			17.3	38			14.5	0.1	22.4	15.7
74	12	09	EA-C	48	5	17.3	36	3	13	14.0	0.2	28.3	16.0
74	12	09	MLA-GAM			291.0							
74	28	10	EA-C	55	10	9.0	38	7	17	6.0	1.2	33.3	7.3
74	28	10	MLA-GAM			297.0							
74	04	11	EA-C	29	7	3.2	25	4	14	1.4	0.3	40.7	2.7
74	04	11	MLA-GAM			302.0							
74	15	11	EA-C	49	7	14.1	37	3	13	8.0	0.1	63.9	8.1
74	15	11	MLA-GAM			296.0							
74	27/11/74 ANALYTICAL ERROR, NO NITRATE RESULT												
74	27	11	EA-C	29	26	14.0	50	3	12	12.8	0.0		12.8
74	27	11	MLA-GAM			328.0							
74	09	12	EA-0900	33		5.1			17	0.3	0.0	10.7	1.4
74	09	12	EA-1100	25		1.0			10	0.3	0.0	11.3	0.8
74	09	12	EA-1300	25		1.9			10	0.9	0.0	12.3	1.7
74	09	12	EA-1500	62		4.1			12	2.5	0.0	12.8	3.2
74	09	12	EA-1700	33		8.6			12	4.1	0.0	12.4	[illegible]
74	09	12	EA-1900	292		25.4			14	6.7	0.0	7.6	12.6
74	09	12	EA-2100	175		15.1			12	8.9	0.0	6.8	9.4
74	09	12	EA-2300	104		14.5			17	10.4	0.0	6.0	11.1
74	10	12	EA-0100	54		12.9			21	11.1	0.0	5.1	11.7
74	10	12	EA-0300	67		15.4			21	12.0	0.0	5.1	14.7
74	10	12	EA-0500	46		17.3			21	11.9	0.0	5.7	12.5
74	10	12	EA-0700	92		13.7			24	10.5	0.0	5.3	11.6
74	10	12	EA-0900	91		12.6			13	9.0	0.4	7.4	10.2
74	10	12	EA-1100	46		11.5			13	9.2	0.2	8.2	10.3
74	10	12	EA-1300	41		12.8			12	10.7	0.7	9.7	11.2
74	10	12	EA-1500	46		14.0			12	11.5	1.5	9.0	12.4
74	10	12	EA-1700	58		22.5			15	13.6	0.4	8.6	14.0
74	10	12	EA-1900	58		16.0			17	13.9	0.3	8.2	14.5
74	10	12	EA-2100	75		17.2			15	13.9	0.1	7.6	14.5
74	10	12	EA-2300	91		17.3			15	14.0	0.0	6.9	14.7
74	11	12	EA-0100	62		16.2			15	14.0	0.2	6.9	14.9
74	11	12	EA-0300	56		16.7			13	14.8	0.3	6.9	15.3
74	11	12	EA-0500	100		18.9			13	14.9	0.8	7.5	16.3
74	11	12	EA-0700	75		17.9			15	12.1	2.7	8.3	12.4
74	11	12	EA-0900	44		13.5			16	10.5	0.1	8.9	12.1
74	11	12	EA-1100	62		11.5			14	9.5	0.1	9.9	11.0
74	11	12	EA-1300	47		12.9			14	11.3	0.1	10.6	12.9
74	11	12	EA-1500	49		14.3			16	13.3	0.1	9.3	14.4
74	11	12	EA-1700	51		16.4			17	15.3	0.1	9.3	15.1
74	11	12	EA-1900	56		17.4			19	15.5	0.1	9.6	16.5
74	11	12	EA-2100	57		19.1			17	17.0	0.1	9.5	18.0
74	11	12	EA-2300	67		19.1			19	17.2	0.1	8.9	18.1
74	12	12	EA-0100	57		18.7			17	16.4	0.1	9.7	17.5
74	12	12	EA-0300	310		31.0			16	16.7	0.1	9.4	17.9
74	12	12	EA-0500	243		27.3			16	13.4	0.1	[illegible]	[illegible]

ANALYSES

YEAR	DAY	MON	SAMPLE DESIGNATION	UNFILTERED COD	UNFILTERED BOD	UNFILTERED TKN	FILTERED COD	FILTERED BOD	FILTERED FOC	FILTERED NH3N	FILTERED NO2N	FILTERED NO3N	FILTERED TKN
74	12	12	EA-0700	58		14.1			16	12.6	0.1	7.1	13.2
74	12	12	EA-0900	71		14.9			19	10.7	0.0	4.3	13.1
74	12	12	EA-1300	46		13.7			17	10.9	0.0	4.8	13.3
74	12	12	EA-1700	51		15.5			21	12.5	0.0	4.7	14.8
74	12	12	EA-2100	58		13.9			19	12.2	0.0	4.7	13.4
74	13	12	EA-0100	57		14.7			21	12.5	0.0	4.3	13.7
74	13	12	EA-0500	48		13.6			26	11.8	0.0	4.0	13.2
74	13	12	EA-0900	40		11.5			14	9.5	0.0	4.3	10.5
74	13	12	EA-1300	45		13.3			13	11.3	0.0	4.4	12.6
74	13	12	EA-1700	48		15.8			14	14.3	0.0	4.4	15.6
74	13	12	EA-2100	50		17.4			17	13.7	0.0	4.0	15.6
74	14	12	EA-0100	830		59.4			17	15.1	0.0	2.6	16.9
74	14	12	EA-0500	370		38.8			13	14.3	0.0	3.0	15.2
74	14	12	EA-0800	460		42.9			14	14.0	0.0	3.0	15.2
74	17	12	EA-0900	49		7.8	36			6.1	0.0	9.2	7.0
74	17	12	EA-1000				37			6.8	0.0	4.5	10.9
74	17	12	EA-1100	32		8.5	29			7.5	0.0	8.7	8.0
74	17	12	EA-1200	85		13.7	33			10.6	0.1	8.1	10.7
74	17	12	EA-1300	44		10.2	33			8.9	0.0	8.9	9.3
74	17	12	EA-1400	74		17.0	42			14.3	0.0	6.9	15.1
74	17	12	EA-1500	55		18.1	41			10.0	0.6	8.1	10.6
74	17	12	EA-1600	86		19.4	42			15.1	0.0	6.0	16.8
74	17	12	EA-1700	79		20.4	45			17.1	0.0	4.5	18.1
74	17	12	EA-1800	72		19.9	42			16.0	0.0	4.9	17.5
74	17	12	EA-1900	66		19.5	39			15.4	0.0	5.0	16.8
74	17	12	EA-2000	60		18.3	40			16.1	0.0	5.9	17.1
74	17	12	EA-2100	63		17.9	39			14.2	1.9	13.0	15.5
74	17	12	EA-2200	62		17.7	40			14.3	0.0	5.9	15.5
74	17	12	EA-2300	59		16.6	41			14.0	0.0	6.2	15.2
74	17	12	EA-2400	54		16.4	40			13.3	0.0	6.5	14.6
74	18	12	EA-0100	56		15.4	39			13.0	0.0	6.3	14.0
74	18	12	EA-0200	54		14.4	39			13.0	0.0	7.1	13.2
74	18	12	EA-0300	56		13.7	37			12.6	0.0	7.2	12.7
74	18	12	EA-0400	53		13.1	40			11.6	0.0	7.4	11.6
74	18	12	EA-0500	51		12.6	38			11.1	0.0	7.7	11.5
74	18	12	EA-0600	55		11.2	37			10.2	0.0	8.1	11.9
74	18	12	EA-0700	55		9.6	39			9.1	0.0	7.7	9.6
74	18	12	EA-0800	51		9.8	35			6.3	0.0	8.5	8.8
74	18	12	EA-1000	46		8.9	42			7.5	0.0	8.3	8.4
74	18	12	EA-1200	48		9.4	35			8.1	0.1	9.7	8.5
74	18	12	EA-1400	46		11.3	40			9.2	0.4	11.5	10.0
74	18	12	EA-1600	47		12.2	37			10.0	0.0	10.2	10.9
74	18	12	EA-1800	49		11.9	39			10.1	0.0	10.4	11.2
74	18	12	EA-2000	48		11.5	42			10.8	0.0	11.4	11.5
74	18	12	EA-2200	58		11.7	53			9.5	0.0	9.5	9.3
74	18	12	EA-2400	58		10.2	47			9.2	0.0	10.2	9.2
74	19	12	EA-0200	50		8.9	41			7.9	0.4	12.0	7.9
74	19	12	EA-0400	52		9.7	43			9.5	0.0	10.7	9.5

ANALYSIS

YEAR	DAY	MON	SAMPLE DESIGNATION	UNFILTERED COD	UNFILTERED BOD	UNFILTERED TKN	FILTERED COD	FILTERED BOD	FILTERED FOC	FILTERED NH3N	FILTERED NO2N	FILTERED NO3N	FILTERED TKN
74	19	12	EA-0600	52		9.1	45			8.0	0.0	10.9	8.6
74	19	12	EA-0300	52		7.8	46			6.9	0.0	10.9	7.2
74	19	12	EA-0900	49		7.2	47			5.7	0.0	9.9	6.8
74	19	12	EA-1200	40		6.9	48			5.4	0.0	10.8	7.7
74	19	12	EA-1500	43		10.4	40			8.0	0.0	11.3	10.3
74	19	12	EA-1800	47		17.2	40			13.1	0.0	11.4	16.3
74	19	12	EA-2100	49		15.7	41			11.2	0.0	11.5	14.3
74	19	12	EA-2400	50		12.9	44			9.1	0.0	11.4	11.4
74	20	12	EA-0300	63		9.2	42			7.4	0.0	10.6	8.7
74	20	12	EA-0600	56		7.4	45			5.7	0.0	11.7	7.0
74	20	12	EA-0900	61		5.7	45			2.2	0.0	10.4	3.1
74	20	12	EA-1200	56		4.0	48			2.4	0.0	12.3	3.4
74	20	12	EA-1500	61		5.7	49			4.2	0.1	13.0	5.1
74	20	12	EA-1800	49		5.6	45			4.1	0.1	13.6	4.7
74	20	12	EA-2100	49		5.8	45			3.6	0.1	13.0	5.6
74	20	12	EA-2400	50		5.1	45			2.8	0.0	13.8	4.7
74	21	12	EA-0300	50		4.0	47			2.2	0.0	15.4	3.9
74	21	12	EA-0600	47		3.3	45			1.5	0.0	16.0	3.2
75	28	01	EA-0900	116		7.2	107		25	1.3	0.0	11.9	3.1
75	28	01	EA-1000	66		1.9	76		13	0.3	0.2	12.6	1.7
75	28	01	EA-1100	66		3.0	180		13	0.7	0.4	13.1	1.9
75	28	01	EA-1200	68		3.5	74		12	1.0	0.7	12.1	2.3
75	28	01	EA-1300	53		4.2	42		11	1.8	1.4	14.4	3.6
75	28	01	EA-1400	54		4.6	43		16	2.5	1.7	14.7	3.9
75	28	01	EA-1500	67		6.7	45		19	3.5	1.8	12.2	5.0
75	28	01	EA-1600	69		7.3	42		18	3.8	1.8	13.2	5.2
75	28	01	EA-1700	77		10.5	52		26	5.4	2.0	12.0	7.2
75	28	01	EA-1800	75		10.6	48		15	6.3	1.6	13.5	8.3
75	28	01	EA-1900	83		12.9	48		12	7.5	1.7	12.7	9.3
75	28	01	EA-2000	85		11.7	44		15	7.7	1.5	11.4	10.4
75	28	01	EA-2100	81		12.3	46		15	7.8	1.8	11.9	9.7
75	28	01	EA-2200	88		11.6	47		18	7.5	1.9	12.0	9.1
75	28	01	EA-2300	76		11.6	46		15	7.3	1.9	12.2	9.1
75	28	01	EA-2400	74		10.2	45		15	6.7	2.0	12.4	8.7
75	29	01	EA-0100	75		9.2	48		18	5.8	2.1	12.9	7.9
75	29	01	EA-0200	77		9.0	47		17	4.6	1.9	13.1	7.1
75	29	01	EA-0300	71		7.3	50		15	3.5	2.0	12.0	5.0
75	29	01	EA-0400	61		7.2	41		15	3.3	1.9	13.1	5.0
75	29	01	EA-0500	65		4.3	46		15	1.6	1.6	13.4	3.4
75	29	01	EA-0600	67		4.0	47		19	0.9	0.8	14.2	2.7
75	29	01	EA-0700	67		3.8	50		17	0.6	0.3	10.7	2.5
75	29	01	EA-0800	67		2.3	49		16	0.5	0.1	14.6	1.7
75	29	01	EA-0900	70		2.2	45		9	0.5	0.0	14.7	1.9
75	29	01	EA-1000	66		2.3	47		10	0.6	0.0	14.5	1.5
75	29	01	EA-1100	71		2.3	41		8	0.5	0.1	13.7	1.4
75	29	01	EA-1200	70		2.7	45		7	0.5	0.2	13.4	1.9
75	29	01	EA-1300	67		4.0	41		12	0.9	0.5	13.0	2.9
75	29	01	EA-1400	70		3.6	43		12	0.8	0.7	12.3	2.8

ANALYSES

SAMPLE				UNFILTERED			FILTERED						
YEAR	DAY	MON	DESIGNATION	COD	BOD	TKN	COD	BOD	FOC	NH3N	NO2N	NO3N	TKN
75	29	01	EA-1500	65		3.1	46		11	1.0	0.8	13.0	2.0
75	29	01	EA-1600	66		3.1	52		10	0.8	0.7	12.8	2.1
75	29	01	EA-1700	257		3.0	81		13	0.6	0.6	12.5	2.0
75	29	01	EA-1800	80		2.2	56		9	0.7	0.4	12.1	1.9
75	29	01	EA-1900	71		2.9	58		10	0.6	0.3	11.8	2.4
75	29	01	EA-2000	73		3.0	55		9	0.8	0.3	11.0	1.9
75	29	01	EA-2100	69		3.0	53		9	0.7	0.3	11.7	2.1
75	29	01	EA-2200	65		2.3	53		10	0.6	0.4	11.8	2.0
75	29	01	EA-2300	63		3.5	49		9	0.6	0.3	11.9	2.4
75	29	01	EA-2400	99		3.0	55		9	0.6	0.2	12.1	1.9
75	30	01	EA-0100	60		2.7	47		15	0.6	0.1	12.2	2.1
75	30	01	EA-0200	63		2.1	37		15	0.5	0.0	11.6	1.3
75	30	01	EA-0300	56		1.6	39		17	0.3	0.0	10.5	1.3
75	30	01	EA-0400	56		1.4	35		14	0.2	0.1	10.2	1.1
75	30	01	EA-0500	50		1.6	37		12	0.2	0.0	11.1	1.1
75	30	01	EA-0600	56		2.2	39		20	0.2	0.0	11.1	1.5
75	30	01	EA-0700	52		2.0	37		14	0.2	0.0	11.0	1.5
75	30	01	EA-0800	47		2.6	34		14	0.2	0.0	11.0	1.6
75	30	01	EA-0900	50		2.2	35		12	0.2	0.0	10.7	1.5
75	10	02	EA-C	56	8	12.5	53	6	17	9.2	0.5	11.4	12.2
75	10	02	NO MLSS TKN TAKEN										
75	26	02	EA-C	95	6	4.8	47	4	14	2.5	1.0	52.0	3.0
75	26	02	MLA-GAM			337.0							
75	03	03	EA-C	70	9	3.1	47	3	13	0.6	0.2	30.8	1.4
75	03	03	MLA-GAM			42.0							
75	04	03	EA-C	100	16	9.7	56	5	12	5.6	1.0	10.9	0.7
75	04	03	MLA-GAM			35.0							
75	05	03	EA-C	125	19	13.4	57	5	15	9.8	1.3	4.7	10.4
75	05	03	MLA-GAM			71.0							
75	06	03	EA-C	108	14	16.6	57	6	15	9.0	0.3	6.0	13.2
75	06	03	NO MLSS TKN TAKEN										
75	07	03	EA-C	125	17	17.3	55	5	17	12.0	0.5	4.3	13.2
75	07	03	MLA-GAM			74.[illegible]							
75	08	03	MLA-GAM			69.0							
75	03	03	EA-0900				37			0.2	0.1	25.3	1.2
75	03	03	EA-1200				41			0.1	0.2	28.8	1.1
75	03	03	EA-1500				45			0.2	0.4	34.6	1.4
75	03	03	EA-1800				45			0.2	0.4	40.6	1.5
75	03	03	EA-2100				43			0.2	0.2	41.8	1.6
75	03	03	EA-2400				42			0.2	0.5	33.5	1.4
75	04	03	EA-0300				45			0.2	0.2	32.6	1.3
75	04	03	EA-0600				49			0.2	0.1	31.9	1.2
75	04	03	EA-0900				41			0.2	0.2	11.3	1.7
75	04	03	EA-1200				50			0.6	0.6	11.4	2.2
75	04	03	EA-1500				53			2.2	1.1	12.6	3.9
75	04	03	EA-1800				54			4.2	1.1	11.2	6.2
75	04	03	EA-2100				50			5.8	1.1	10.6	7.7
75	04	03	EA-2400				52			7.9	1.4	9.7	9.8

ANALYSES

YEAR	DAY	MON	SAMPLE DESIGNATION	UNFILTERED COD	UNFILTERED BOD	UNFILTERED TKN	FILTERED COD	FILTERED BOD	FILTERED FOC	FILTERED NH3N	FILTERED NO2N	FILTERED NO3N	FILTERED TKN
75	05	03	EA-0300				54			9.4	1.4	8.9	11.2
75	05	03	EA-0600				50			9.9	1.5	8.5	11.3
75	05	03	EA-0900				44			7.1	1.5	6.6	7.5
75	05	03	EA-1200				38			7.2	1.6	7.1	7.7
75	05	03	EA-1500				45			8.9	1.5	6.8	9.5
75	05	03	EA-1800				53			10.2	1.5	6.6	11.2
75	05	03	EA-2100				60			10.2	1.4	5.8	11.8
75	05	03	EA-2400				61			10.9	1.4	5.7	12.3
75	06	03	EA-0300				59			11.5	1.3	5.1	13.0
75	06	03	EA-0600				61			11.5	0.8	3.9	13.1
75	06	03	EA-0900				48			9.6	0.4	5.0	10.8
75	06	03	EA-1200				50			9.6	0.4	5.4	10.3
75	06	03	EA-1500				51			11.0	0.4	5.7	12.7
75	06	03	EA-1800				61			12.0	0.4	5.9	13.3
75	06	03	EA-2100				57			11.0	0.3	5.8	12.9
75	06	03	EA-2400				55			11.0	0.3	5.3	12.8
75	07	03	EA-0300				51			11.0	0.3	4.5	11.9
75	07	03	EA-0600				47			11.0	0.4	4.4	11.6
75	07	03	EA-0900				50			8.8	0.2	5.3	9.9
75	07	03	EA-1200				46			8.7	0.5	5.5	9.3
75	07	03	EA-1500				54			11.1	0.5	5.2	11.7
75	07	03	EA-1800				57			12.5	0.5	5.0	12.8
75	07	03	EA-2100				57			13.2	0.5	4.9	13.6
75	07	03	EA-2400				63			12.0	0.5	4.1	14.5
75	08	03	EA-0300				62			13.0	0.5	3.0	14.4
75	08	03	EA-0600				60			13.5	0.5	2.9	13.8
75	11	03	EA-C	92	8	3.0	43	2	16	1.0	0.2	13.5	1.6
75	11	03	MLA-GAM			95.0							
75	12	03	EA-C	121	15	14.0	54	7	17	9.1	0.9	9.2	11.2
75	12	03	MLA-GAM			91.0							
75	13	03	EA-C	276	47	27.6	69	21	30	16.0	0.6	1.2	19.2
75	13	03	MLA-GAM			104.0							
75	14	03	EA-C	125	19	20.5	68	8	20	15.0	0.5	2.2	17.4
75	14	03	MLA-GAM			81.0							
75	15	03	EA-C	95	12	18.3	63	4	16	12.6	0.3	3.3	15.3
75	15	03	MLA-GAM			102.0							
75	16	03	EA-C	63	6	13.4	40	6	14	9.7	0.7	7.7	10.7
75	16	03	MLA-GAM			111.0							
75	17	03	EA-C	72	7	11.7	53	3	17	5.3	1.2	14.3	7.2
75	17	03	MLA-GAM			106.0							
75	18	03	EA-C	76	8	6.5	52	3	16	2.0	1.3	13.7	3.1
75	18	03	MLA-GAM			149.0							
75	19	03	MLA-GAM			141.0							
75	11	03	EA-0900				48			1.9	2.5	12.5	2.8
75	11	03	EA-1200				47			1.0	1.9	15.1	1.9
75	11	03	EA-1500				43			1.7	2.4	14.6	2.2
75	11	03	EA-1800				63			2.6	3.1	15.9	3.5
75	11	03	EA-2100				53			2.7	3.4	17.6	3.0

ANALYSES

			SAMPLE	UNFILTERED			FILTERED						
YEAR	DAY	MON	DESIGNATION	COD	BOD	TKN	COD	BOD	FOC	NH3N	NO2N	NO3N	TKN
75	11	03	EA-2400				45			1.7	3.4	14.6	2.6
75	12	03	EA-0300				39			0.5	2.4	15.6	1.2
75	12	03	EA-0600				37			0.5	1.4	13.6	1.5
75	12	03	EA-0900				47			0.6	0.1	14.3	2.2
75	12	03	EA-1200				43			1.1	0.8	14.2	2.4
75	12	03	EA-1500				56			4.6	0.6	13.9	6.4
75	12	03	EA-1800				57			8.3	0.6	13.1	10.1
75	12	03	EA-2100				70			10.1	0.5	10.9	12.8
75	12	03	EA-2400				88			12.9	1.5	6.7	16.3
75	13	03	EA-0300				80			13.8	1.6	3.7	18.4
75	13	03	EA-0600				83			13.0	1.1	2.7	20.5
75	13	03	EA-0900				58			13.0	1.2	2.7	17.4
75	13	03	EA-1200				64			14.0	0.9	2.2	18.4
75	13	03	EA-1500				71			16.0	0.7	1.4	22.0
75	13	03	EA-1800				75			17.0	0.6	1.3	22.8
75	13	03	EA-2100				62			16.0	0.5	1.3	21.1
75	13	03	EA-2400				71			18.0	0.2	1.7	22.4
75	14	03	EA-0300				62			15.0	0.4	1.4	18.8
75	14	03	EA-0600				65			14.0	0.3	1.4	16.7
75	14	03	EA-0900				58			12.3	0.3	1.4	14.2
75	14	03	EA-1200				58			11.3	0.6	2.7	13.6
75	14	03	EA-1500				60			14.1	0.6	2.8	16.2
75	14	03	EA-1800				65			16.6	0.8	3.3	18.3
75	14	03	EA-2100				66			16.0	0.6	2.8	18.0
75	14	03	EA-2400				68			16.0	0.7	2.6	17.9
75	15	03	EA-0300				67			15.0	0.5	2.2	17.5
75	15	03	EA-0600				59			15.0	0.4	2.1	17.6
75	15	03	EA-0900	FILT COD RESULT ELIMINATED DUE TO ANALYTICAL ERROR									
75	15	03	EA-0900							13.5	0.1	1.7	15.9
75	15	03	EA-1200				52			12.2	0.3	3.1	14.6
75	15	03	EA-1500				50			13.1	0.4	3.7	15.2
75	15	03	EA-1800				57			13.1	0.5	3.9	13.4
75	15	03	EA-2100				50			12.1	0.3	3.5	14.7
75	15	03	EA-2400				57			11.4	0.3	3.9	12.9
75	16	03	EA-0300				53			11.1	0.3	4.1	12.8
75	16	03	EA-0600				50			10.9	0.3	4.4	11.9
75	16	03	EA-0900				53			10.6	0.2	5.4	12.7
75	16	03	EA-1200				54			8.8	0.7	7.8	11.9
75	16	03	EA-1500				50			10.5	0.9	8.7	12.4
75	16	03	EA-1800				54			11.7	0.8	8.8	13.3
75	16	03	EA-2100				51			11.1	0.6	8.0	13.0
75	16	03	EA-2400				52			9.8	0.6	8.3	12.1
75	17	03	EA-0300				52			8.7	0.6	8.2	11.1
75	17	03	EA-0600				47			8.1	0.7	9.6	10.9
75	17	03	EA-0900				35			5.8	0.6	11.2	7.8
75	17	03	EA-1200				40			4.8	1.3	14.7	6.3
75	17	03	EA-1500				48			7.0	1.4	12.6	9.2
75	17	03	EA-1800				53			7.3	1.6	13.4	9.3

ANALYSES

			SAMPLE	UNFILTERED			FILTERED						
YEAR	DAY	MON	DESIGNATION	COD	BOD	TKN	COD	BOD	FOC	NH3N	NO2N	NO3N	TKN
75	17	03	EA-2100				43			6.2	1.4	13.6	9.1
75	17	03	EA-2400				47			4.8	1.4	13.8	6.7
75	18	03	EA-0300				43			3.5	1.2	8.9	6.0
75	18	03	EA-0600				35			2.3	1.2	15.8	4.1
75	18	03	EA-0900				43			1.0	0.0	16.0	2.3
75	18	03	EA-1200				43			0.4	0.4	17.6	1.7
75	18	03	EA-1500				44			1.2	2.2	20.8	2.6
75	18	03	EA-1800				49			2.7	1.9	20.1	3.9
75	18	03	EA-2100				46			1.7	2.9	23.1	2.7
75	18	03	EA-2400				47			2.6	1.8	20.2	4.1
75	19	03	EA-0300				47			2.0	1.3	18.7	3.7
75	19	03	EA-0600				43			1.3	1.0	18.0	2.4
75	24	03	EA-C	35	4	1.8	33	4	12	1.3	0.6	8.3	1.8
75	24	03	MLA-GAM			65.0							
75	25	03	EA-C	53	8	2.4	32	3	11	1.4	0.6	7.2	1.9
75	25	03	MLA-GAM			51.0							
75	26	03	EA-C	57	7	3.1	37	3	11	0.6	0.7	8.6	1.1
75	26	03	MLA-GAM			62.0							
75	27	03	EA-C	64	8	2.3	35	3	12	1.1	0.6	7.3	1.2
75	27	03	MLA-GAM			66.0							
75	24	03	EA-0900				29			1.7	0.7	8.1	1.7
75	24	03	EA-1200				26			0.9	0.8	9.1	1.0
75	24	03	EA-1500				28			1.2	1.5	9.4	1.2
75	24	03	EA-1800				29			1.1	1.4	9.1	1.1
75	24	03	EA-2100				26			1.0	0.6	9.1	1.2
75	24	03	EA-2400				57			0.7	0.6	9.0	1.0
75	25	03	EA-0300				26			0.9	0.2	8.2	1.1
75	25	03	EA-0600				25			0.7	0.3	8.6	0.9
75	25	03	EA-0900				26			0.6	0.1	6.6	1.3
75	25	03	EA-1200				26			0.2	0.6	6.9	0.9
75	25	03	EA-1500				30			2.9	0.9	6.8	3.7
75	25	03	EA-1800				31			3.4	1.0	6.7	4.3
75	25	03	EA-2100				33			2.1	1.1	6.9	3.0
75	25	03	EA-2400				38			0.5	1.0	7.6	1.2
75	26	03	EA-0300				32			0.1	0.3	7.0	0.7
75	26	03	EA-0600				27			0.1	0.1	7.3	0.6
75	26	03	EA-0900				32			0.3	0.2	7.5	1.0
75	26	03	EA-1200				32			0.4	0.6	7.8	1.1
75	26	03	EA-1500				33			0.5	1.4	9.4	1.1
75	26	03	EA-1800				34			0.5	1.3	9.9	1.1
75	26	03	EA-2100				38			1.2	1.0	9.9	1.5
75	26	03	EA-2400				39			0.5	0.8	9.6	1.0
75	27	03	EA-0300				37			0.5	0.7	8.5	1.1
75	27	03	EA-0600				35			0.5	0.6	9.0	1.1
75	27	03	EA-0900				34			0.7	0.1	7.8	1.7

ANALYSES

YEAR	DAY	MON	SAMPLE DESIGNATION	UNFILTERED COD	UNFILTERED BOD	UNFILTERED TKN	FILTERED COD	FILTERED BOD	FILTERED FOC	FILTERED NH3N	FILTERED NO2N	FILTERED NO3N	FILTERED TKN
75	27	03	EA-1200				36			1.1	0.2	8.2	1.6
75	27	03	EA-1500				35			1.0	0.9	8.6	1.7
75	27	03	EA-1800				35			0.7	1.4	10.0	1.5
75	27	03	EA-2100				36			0.7	1.1	9.1	1.6
75	27	03	EA-2400				33			0.7	0.6	9.2	1.6
75	28	03	EA-0300				30			0.8	0.4	8.9	1.3
75	28	03	EA-0600				29			1.0	0.3	9.2	1.5
75	07	04	EA-C	59	9	3.9	43	7	15	0.9	0.1	13.7	3.3
75	07	04	MLA-GAM			75.0							
75	08	04	EA-C	80	13	12.5	57	8	17	8.9	1.8	13.4	10.0
75	08	04	MLA-GAM			85.0							
75	09	04	EA-C	57	7	1.9	34	4	15	0.7	0.3	13.7	0.8
75	09	04	MLA-GAM			108.0							
75	10	04	EA-C	63	7	2.5	28	4	14	0.8	0.3	13.8	1.9
75	10	04	MLA-GAM			107.0							
75	11	04	MLA-GAM			91.0							
75	07	04	EA-0900				50			0.3	0.1	11.5	1.6
75	07	04	EA-1200				38			0.5	0.1	12.7	1.0
75	07	04	EA-1500				37			0.4	0.6	15.7	1.1
75	07	04	EA-1800				41			0.6	0.1	11.9	1.3
75	07	04	EA-2100				39			0.4	0.1	14.6	1.4
75	07	04	EA-2400				40			0.4	0.1	13.5	1.2
75	08	04	EA-0300				40			0.4	0.1	13.6	1.2
75	08	04	EA-0600				38			0.5	0.0	13.1	1.2
75	08	04	EA-0900				36			0.8	0.1	12.5	0.9
75	08	04	EA-1200				38			6.4	0.9	13.4	6.5
75	08	04	EA-1500				51			19.6	1.2	12.8	21.3
75	08	04	EA-1800				71			19.5	2.2	12.3	20.9
75	08	04	EA-2100				65			19.7	2.7	12.2	21.5
75	08	04	EA-2400				42			10.4	3.0	9.0	16.4
75	09	04	EA-0300				40			5.7	2.6	8.4	7.9
75	09	04	EA-0600				37			1.2	2.1	9.9	2.9
75	09	04	EA-0900				36			0.4	0.1	13.0	1.5
75	09	04	EA-1200				37			0.4	0.2	13.0	1.2
75	09	04	EA-1500				41			0.9	0.6	13.7	1.8
75	09	04	EA-1800				40			0.8	0.3	15.3	1.7
75	09	04	EA-2100				28			0.5	0.4	15.9	1.3
75	09	04	EA-2400				42			0.8	0.3	16.6	1.5
75	10	04	EA-0300				40			0.5	0.2	14.6	1.2
75	10	04	EA-0600				21			0.5	0.2	14.1	1.3
75	10	04	EA-0900				44			0.5	0.3	11.8	0.8
75	10	04	EA-1200				36			0.2	[illegible]	12.9	0.4
75	10	04	EA-1500				34			0.5	0.6	13.5	1.6
75	10	04	EA-1800				39			0.2	0.7	14.9	1.6
75	10	04	EA-2100				41			0.3	0.2	15.5	2.0
75	10	04	EA-2400				34			0.5	0.4	15.4	2.1
75	11	04	EA-0300				38			0.5	0.3	14.7	1.8
75	11	04	EA-0600				36			0.4	0.1	14.3	1.6

ANALYSES

YEAR	DAY	MON	SAMPLE DESIGNATION	UNFILTERED COD	UNFILTERED BOD	UNFILTERED TKN	FILTERED COD	FILTERED BOD	FILTERED FOC	FILTERED NH3N	FILTERED NO2N	FILTERED NO3N	FILTERED TKN
75	15	04	EA-C	104	15	6.9	67	12	21	1.0	1.8	4.8	1.7
75	15	04	MLA-GAM			114.0							
75	16	04	EA-C		13	14.6	77	6	22	8.7	2.4	5.8	9.2
75	16	04	MLA-GAM			97.0							
75	17	04	EA-C	79	9	9.6	47	4	13	5.0	3.8	5.3	7.5
75	17	04	MLA-GAM			118.0							
75	18	04	EA-C				41	3	12	4.2	3.1	4.6	6.1
75	18	04	MLA-GAM			124.0							
75	19	04	EA-C	67	7	4.2	36	3	11	1.8	1.1	8.6	3.0
75	19	04	MLA-GAM			87.0							
75	20	04	NO MLSS TKN DUE TO OPERATOR ERROR.										
75	20	04	EA-C	68	10	2.7	30	3	10	0.4	0.3	4.6	1.4
75	21	04	EA-C	66	7	8.6	39	3	10	4.4	1.4	15.2	7.0
75	21	04	MLA-GAM			107.0							
75	22	04	EA-C	83	9	15.7	48	3	10	11.6	1.5	15.5	13.3
75	22	04	MLA-GAM			93.0							
75	23	04	EA-C	83	7	8.4	37	3	10	3.6	0.6	13.9	4.8
75	23	04	MLA-GAM			134.0							
75	24	04	EA-C	110	14	11.9	42	5	15	5.5	0.3	10.0	7.4
75	24	04	MLA-GAM			134.0							
75	25	04	MLA-GAM			142.0							
75	15	04	EA-1100				62		17	0.3	0.1	4.0	1.0
75			ERROR IN DILUTION ON NO3 ANALYSIS FOR SAMPLES 15 04 EA 1200,2300										
75			AND 16 04 EA-0100,0300,0500 HRS. THESE VALUES HAVE BEEN ADJUSTED										
75	15	04	EA-1300				53		15	0.4	0.6	4.7	0.7
75	15	04	EA-1500				52		13	0.3	0.7	14.0	0.8
75	15	04	EA-1700				56		11	0.6	1.2	17.8	1.0
75	15	04	EA-1900				32		14	0.4	1.7	18.0	0.7
75	15	04	EA-2100				35		15	0.5	2.1	16.0	0.9
75	15	04	EA-2300				43		17	0.8	2.9	16.1	1.3
75	16	04	EA-0100				76		17	1.8	3.3	11.8	2.7
75	16	04	EA-0300				84		23	2.3	2.9	24.0	3.3
75	16	04	EA-0500				62		27	2.2	2.6	17.2	3.1
75	16	04	EA-0700				57		28	1.0	2.2	14.8	1.7
75	16	04	EA-0900				36		27	0.5	1.1	12.6	1.1
75	16	04	EA-1100				68		20	1.3	1.0	4.6	2.9
75	16	04	EA-1300				62		16	2.7	1.6	5.4	3.3
75	16	04	EA-1500				97		16	5.6	1.6	5.2	7.2
75	16	04	EA-1700				70		16	6.6	1.8	5.5	8.0
75	16	04	EA-1900				79		20	6.8	2.1	5.0	9.4
75	16	04	EA-2100				81		20	7.5	2.6	4.5	10.1
75	16	04	EA-2300				82		21	9.0	3.2	3.8	11.7
75	17	04	EA-0100				54		21	9.7	3.5	3.9	12.2
75	17	04	EA-0300				52		20	11.0	3.1	4.2	13.1
75	17	04	EA-0500				47		17	11.8	2.8	5.1	13.7
75	17	04	EA-0700				45		16	12.1	2.6	5.8	14.0
75	17	04	EA-0900				47		14	10.5	2.5	6.4	11.4
75	17	04	EA-1100				53		13	9.8	4.6	10.3	12.3

ANALYSES

YEAR	DAY	MON	SAMPLE DESIGNATION	UNFILTERED COD	UNFILTERED BOD	UNFILTERED TKN	FILTERED COD	FILTERED BOD	FILTERED FOC	FILTERED NH3N	FILTERED NO2N	FILTERED NO3N	FILTERED TKN
75	17	04	EA-1300				44		11	8.6	4.4	10.6	10.9
75	17	04	EA-1500				41		10	5.4	3.8	9.8	7.2
75	17	04	EA-1700				39		10	3.3	3.5	9.1	4.9
75	17	04	EA-1900				41		10	1.3	3.6	7.4	2.6
75	17	04	EA-2100				39		10	0.7	2.9	7.9	1.6
75	17	04	EA-2300				39		16	1.9	4.3	5.2	3.4
75	18	04	EA-0100				50		11	3.9	4.8	3.3	5.9
75	18	04	EA-0300				49		14	6.1	4.6	1.6	8.3
75	18	04	EA-0500				55		15	7.0	4.0	0.9	9.4
75	18	04	EA-0700				58		17	6.6	3.7	0.3	9.2
75	18	04	EA-0900				59		56	5.1	4.2	0.4	8.0
75	18	04	EA-1100				50		14	3.6	5.5	0.1	5.6
75	18	04	EA-1300				47		11	2.4	6.5	0.9	4.5
75	18	04	EA-1500				45		13	0.8	6.7	2.7	2.6
75	18	04	EA-1700				41		13	0.1	4.0	4.6	2.9
75	18	04	EA-1900				41		13	0.0	1.0	6.0	1.7
75	18	04	EA-2100				39		12	0.1	0.4	5.2	1.4
75	18	04	EA-2300				33		12	0.1	0.4	6.1	1.5
75	19	04	EA-0100				42		15	2.7	2.3	5.0	4.1
75	19	04	EA-0300				46		14	7.3	3.3	5.0	9.2
75	19	04	EA-0500				47		15	8.8	3.3	5.3	10.8
75	19	04	EA-0700				42		11	8.8	3.1	5.8	10.5
75	19	04	EA-0900				39		11	8.2	3.0	6.5	9.9
75	19	04	EA-1100				38		16	8.3	2.9	9.2	10.4
75	19	04	EA-1400				36		11	4.9	3.4	11.1	6.2
75	19	04	EA-1700				34		12	0.5	2.5	12.4	1.4
75	19	04	EA-2000				33		19	0.2	0.3	11.3	1.1
75	19	04	EA-2300				29		12	0.1	0.1	9.2	1.0
75	19	04	EA-0200				27		12	0.2	0.2	7.9	1.2
75	20	04	EA-0500				34		11	0.2	0.3	7.1	1.2
75	20	04	EA-0800				35		12	0.2	0.2	7.8	1.0
75	20	04	EA-1100				38		10	0.3	0.0	6.0	6.5
75	20	04	EA-1400				36		9	0.2	0.1	5.4	1.5
75	20	04	EA-1700				27		11	0.3	0.2	5.3	1.2
75	20	04	EA-2000				23		10	0.2	0.0	4.4	1.0
75	20	04	EA-2300				25		9	0.2	0.0	3.2	1.0
75	20	04	EA-0200				33		10	0.5	0.6	3.5	0.9
75	21	04	EA-0500				37		9	0.8	1.1	4.3	1.4
75	21	04	EA-0800				33		9	0.3	0.1	5.7	2.0
75	21	04	EA-1100				36		9	0.1	0.2	7.2	1.2
75	21	04	EA-1400				37		9	0.7	0.8	11.0	0.9
75	21	04	EA-1700				39		9	2.1	1.2	13.9	2.2
75	21	04	EA-2000				37		9	3.1	1.3	12.7	4.8
75	21	04	EA-2300				37		9	4.0	1.5	15.5	5.4
75	21	04	EA-0200				37		9	5.4	1.7	16.3	7.0
75	22	04	EA-0500				39		9	6.7	1.8	17.2	8.1
75	22	04	EA-0800				38		9	7.2	2.1	18.9	8.8
75	22	04	EA-1100				42		12	8.3	2.4	20.6	9.4

ANALYSES

SAMPLE YEAR	DAY	MON	DESIGNATION	UNFILTERED COD	UNFILTERED BOD	UNFILTERED TKN	FILTERED COD	FILTERED BOD	FILTERED FOC	FILTERED NH3N	FILTERED NO2N	FILTERED NO3N	FILTERED TKN
75	22	04	EA-1400				39		10	12.7	2.1	17.9	14.4
75	22	04	EA-1700				42		10	12.9	1.7	15.3	14.8
75	22	04	EA-2000				45		9	13.5	1.6	13.4	15.6
75	22	04	EA-2300				34		10	18.0	1.5	12.5	18.4
75	22	04	EA-0200				37		13	13.6	1.4	13.6	16.0
75	23	04	EA-0500				36		10	8.9	1.2	12.6	10.0
75	23	04	EA-0800				39		11	5.5	1.2	12.0	5.9
75	23	04	EA-1100				39		10	8.9	1.3	14.7	9.9
75	23	04	EA-1300				36		10	8.7	1.3	15.7	17.1
75	23	04	EA-1500				35		9	4.8	1.2	17.8	8.6
75	23	04	EA-1700				37		11	1.7	1.3	18.7	2.1
75	23	04	EA-1900				35		10	0.5	0.4	14.6	1.0
75	23	04	EA-2100				35		10	0.4	0.1	14.9	0.9
75	23	04	EA-2300				32		10	0.4	0.1	14.4	0.9
75	24	04	EA-0100				36		10	0.1	0.6	13.4	0.8
75	24	04	EA-0300				33		10	2.6	0.7	11.4	3.3
75	24	04	EA-0500				35		10	3.9	0.5	11.4	4.7
75	24	04	EA-0700				36		11	5.2	0.2	10.3	6.2
75	24	04	EA-0900				40		10	5.1	0.2	9.3	6.7
75	24	04	EA-1100				33		12	5.6	0.2	9.6	7.2
75	24	04	EA-1300				35		15	6.7	0.3	10.4	8.8
75	24	04	EA-1500				37		14	6.9	0.2	10.1	8.8
75	24	04	EA-1700				39		11	6.5	0.2	11.1	8.2
75	24	04	EA-1900				40		12	5.8	0.2	11.3	7.3
75	24	04	EA-2100				41		13	4.8	0.2	11.7	6.6
75	24	04	EA-2300				42		13	4.0	0.2	12.3	5.8
75	25	04	EA-0100				39		14	4.3	0.3	11.3	5.7
75	25	04	EA-0300				46		13	5.8	0.3	9.5	7.5
75	25	04	EA-0500				46		17	6.5	0.4	9.5	8.1
75	25	04	EA-0700				42		15	5.8	0.4	9.6	7.2
75	25	04	EA-0900				40		12	3.6	0.4	10.0	5.0
75			FOLLOWING ARE THE 2 HR RESULTS FROM 19/4 1100HRS TO 23/4 1100 HRS AS										
75			INTERPRETED FROM A CONTINUOUS RECORD DURING THIS PERIOD BASED ON 3 HR										
75			SAMPLES										
75	19	04	EA-1100				38		16	8.3	2.9	9.2	10.4
75	19	04	EA-1300				37		13	5.5	3.2	10.5	7.5
75	19	04	EA-1500				35		11	2.5	3.0	11.5	5.0
75	19	04	EA-1700				34		12	0.5	2.5	12.4	1.4
75	19	04	EA-1900				34		17	0.3	1.0	11.5	1.2
75	19	04	EA-2100				32		17	0.1	0.3	10.5	1.1
75	19	04	EA-2300				29		12	0.1	0.1	9.2	1.0
75	20	04	EA-0100				28		12	0.2	0.1	8.5	1.1
75	20	04	EA-0300				29		12	0.2	0.2	7.5	1.2
75	20	04	EA-0500				34		11	0.2	0.3	7.1	1.2
75	20	04	EA-0700				34		11	0.2	0.3	7.5	1.1
75	20	04	EA-0900				36		11	0.2	0.1	7.2	2.5
75	20	04	EA-1100				38		10	0.3	0.0	6.0	6.5
75	20	04	EA-1300				32		10	0.3	0.0	5.6	2.5

ANALYSES

SAMPLE				UNFILTERED			FILTERED						
YEAR	DAY	MON	DESIGNATION	COD	BOD	TKN	COD	BOD	FOC	NH3N	NO2N	NO3N	TKN
75	20	04	EA-1500				29		10	0.2	0.1	5.4	1.4
75	20	04	EA-1700				27		11	0.3	0.2	5.3	1.2
75	20	04	EA-1900				24		10	0.3	0.1	4.8	1.1
75	20	04	EA-2100				24		10	0.2	0.0	4.0	1.0
75	20	04	EA-2300				25		9	0.2	0.0	3.2	1.0
75	21	04	EA-0100				31		10	0.3	0.4	3.4	1.0
75	21	04	EA-0300				34		9	0.6	0.8	4.0	1.0
75	21	04	EA-0500				37		9	0.8	1.1	4.3	1.4
75	21	04	EA-0700				34		9	0.5	0.9	5.5	1.8
75	21	04	EA-0900				34		9	0.2	0.1	6.0	1.5
75	21	04	EA-1100				36		9	0.1	0.2	7.2	1.2
75	21	04	EA-1300				37		9	0.5	0.6	9.5	1.0
75	21	04	EA-1500				38		9	1.0	1.0	12.0	1.0
75	21	04	EA-1700				39		9	2.1	1.2	13.9	2.2
75	21	04	EA-1900				38		9	2.5	1.2	13.0	4.0
75	21	04	EA-2100				37		9	3.5	1.4	13.5	5.0
75	21	04	EA-2300				37		9	4.0	1.5	15.5	5.4
75	22	04	EA-0100				37		9	5.0	1.6	16.0	6.5
75	22	04	EA-0300				38		9	6.0	1.7	16.5	7.2
75	22	04	EA-0500				39		9	6.7	1.8	17.2	8.1
75	22	04	EA-0700				39		9	7.0	1.9	18.0	8.5
75	22	04	EA-0900				39		10	7.5	2.2	19.5	9.0
75	22	04	EA-1100				42		12	8.3	2.4	20.6	9.4
75	22	04	EA-1300				40		11	11.0	2.2	18.5	13.0
75	22	04	EA-1500				40		10	12.9	2.0	16.5	14.5
75	22	04	EA-1700				42		10	12.9	1.7	15.3	14.8
75	22	04	EA-1900				44		9	13.3	1.6	14.0	15.5
75	22	04	EA-2100				41		9	14.5	1.6	13.0	16.0
75	22	04	EA-2300				34		10	18.0	1.5	12.5	18.4
75	23	04	EA-0100				36		12	15.0	1.4	13.0	16.5
75	23	04	EA-0300				36		12	12.0	1.3	13.0	14.0
75	23	04	EA-0500				36		10	8.9	1.2	12.6	10.0
75	23	04	EA-0700				38		10	6.5	1.2	12.3	7.0
75	23	04	EA-0900				39		11	6.5	1.2	13.0	7.0
75	23	04	EA-1100				39		10	8.9	1.3	14.7	9.9
75	END OF INTERPRETED RECORD												
75	05	05	EA-C		10	9.2	48	3	11	6.9	8.2	29.8	8.0
75	05	05	MLA-GAM			138.0							
75	12	05	EA-C	86	13	7.9	46	6	13	3.2	2.4	9.5	5.4
75	12	05	MLA-GAM			87.0							
75	13	05	EA-C	101	22	13.2	51	5	17	7.1	2.8	6.8	9.8
75	13	05	MLA-GAM			54.0							
75	14	05	EA-C	74	14	8.0	51	6	10	5.7	3.3	8.3	6.3
75	14	05	MLA-GAM			101.0							
75	15	05	EA-C	95	12	12.6	61	7	15	7.0	4.5	9.5	11.8
75	15	05	MLA-GAM			127.0							
75	12	05	EA-0900				47		19	0.6	0.2	8.5	3.0
75	12	05	EA-1200				33		11	0.5	0.1	9.4	1.6

ANALYSES

YEAR	DAY	MON	SAMPLE DESIGNATION	UNFILTERED COD.	UNFILTERED BOD	UNFILTERED TKN	FILTERED COD	FILTERED BOD	FILTERED FOC	FILTERED NH3N	FILTERED NO2N	FILTERED NO3N	FILTERED TKN
75	12	05	EA-1500				31		12	0.8	0.8	10.5	1.8
75	12	05	EA-1800				35		13	1.0	2.3	11.2	2.7
75	12	05	EA-2100				45		15	2.8	3.7	11.4	4.8
75	12	05	EA-2400				46		14	5.1	4.2	10.3	7.8
75	13	05	EA-0300				48		16	6.1	4.1	9.0	8.9
75	13	05	EA-0600				48		15	5.6	3.8	8.8	8.3
75	13	05	EA-0900				42		12	2.7	3.5	9.0	4.7
75	13	05	EA-1200				40		9	3.2	3.0	9.2	4.6
75	13	05	EA-1500				41		9	7.3	2.6	8.5	9.4
75	13	05	EA-1800				41		10	10.0	2.5	7.1	12.6
75	13	05	EA-2100				61		14	9.3	2.9	6.8	12.2
75	13	05	EA-2400				62		14	9.1	3.1	6.3	12.0
75	14	05	EA-0300				53		16	7.9	3.1	6.0	10.7
75	14	05	EA-0600				59		11	6.0	3.0	6.4	8.2
75	14	05	EA-0900				53		8	2.5	2.9	7.3	3.3
75	14	05	EA-1200				40		10	3.5	3.1	8.5	4.3
75	14	05	EA-1500				41		9	7.3	3.4	8.6	9.1
75	14	05	EA-1800				54		8	8.1	3.5	7.7	9.3
75	14	05	EA-2100				61		11	6.9	3.6	6.3	8.3
75	14	05	EA-2400				61		30	6.6	3.7	8.3	8.3
75	15	05	EA-0300				54		9	5.6	3.8	8.0	7.0
75	15	05	EA-0600				46		9	4.5	3.7	8.2	5.9
75	15	05	EA-0900				45		15	1.6	3.6	11.1	3.4
75	15	05	EA-1200				46		12	3.0	4.1	12.9	4.3
75	15	05	EA-1500				49		13	7.5	4.5	4.5	9.7
75	15	05	EA-1800				56		17	10.0	5.0	5.0	11.8
75	15	05	EA-2100				59		16	8.7	5.0	8.7	11.2
75	15	05	EA-2400				55		17	8.8	5.1	8.4	11.3
75	16	05	EA-0300				56		15	8.2	5.0	7.5	10.1
75	16	05	EA-0600				53		17	6.9	5.0	7.5	9.6
75	26	05	EA-C	101	16	8.8	61	9	17	2.9	4.0	21.0	7.0
75	26	05	MLA-GAM			74.0							
75	27	05	EA-C	132	26	10.2	68	21	30	1.6	3.9	18.9	7.0
75	27	05	MLA-GAM			102.3							
75	28	05	EA-C	94	21	6.1	62	7	21	1.3	3.1	11.3	5.0
75	28	05	MLA-GAM			114.0							
75	29	05	EA-C	41	13	4.8	49	6	18	1.2	1.0	7.0	3.1
75	29	05	MLA-GAM			39.0							
75	26	05	EA-0900				83		38	5.0	1.6	12.8	6.4
75	26	05	EA-1200				45		13	0.6	0.6	12.9	1.3
75	26	05	EA-1500				40		13	0.8	2.2	18.6	1.7
75	26	05	EA-1800				39		15	3.2	3.3	20.1	4.9
75	26	05	EA-2100				57		16	5.1	5.5	23.5	6.3
75	26	05	EA-2400				57		17	6.1	5.8	25.2	7.1
75	27	05	EA-0300				58		16	6.3	6.4	24.6	7.1
75	27	05	EA-0600				55		15	6.2	6.3	21.7	7.2
75	27	05	EA-0900				52		16	0.7	5.0	23.0	5.0
75	27	05	EA-1200				45		17	0.2	3.9	18.9	1.[illegible]

ANALYSES

YEAR	DAY	MON	SAMPLE DESIGNATION	UNFILTERED COD	UNFILTERED BOD	UNFILTERED TKN	FILTERED COD	FILTERED BOD	FILTERED FOC	FILTERED NH3N	FILTERED NO2N	FILTERED NO3N	FILTERED TKN
75	27	05	EA-1500				47		19	0.4	3.7	17.3	2.9
75	27	05	EA-1800				55		17	0.5	3.7	18.7	3.1
75	27	05	EA-2100				65		31	0.5	4.5	20.5	4.6
75	27	05	EA-2400				83		37	2.2	4.4	16.6	8.1
75	28	05	EA-0300				84		36	2.5	4.3	14.7	8.5
75	28	05	EA-0600				74		35	3.3	4.0	13.0	6.2
75	28	05	EA-0900				60		20	1.0	4.0	21.0	3.1
75	28	05	EA-1200				56		19	0.6	3.3	11.0	2.8
75	28	05	EA-1500				55		16	1.1	4.3	13.7	2.3
75	28	05	EA-1800				60		19	2.3	4.1	14.9	3.7
75	28	05	EA-2100				62		20	2.1	3.8	15.8	3.6
75	28	05	EA-2400				58		22	1.6	3.4	12.6	2.9
75	29	05	EA-0300				61		17	1.0	2.9	12.0	1.9
75	29	05	EA-0600				55		17	0.5	1.7	8.3	1.3
75	29	05	EA-0900				47		19	1.9	0.3	5.5	2.0
75	29	05	EA-1200				44		16	0.8	0.4	5.3	1.4
75	29	05	EA-1500				45		15	1.0	1.5	7.2	2.0
75	29	05	EA-1800				47		15	1.1	2.0	8.0	2.2
75	29	05	EA-2100				51		15	1.0	1.7	8.4	2.3
75	29	05	EA-2400				53		17	1.5	1.2	8.5	2.6
75	30	05	EA-0300				51		16	1.1	0.9	8.2	2.2
75	30	05	EA-0600				46		17	0.9	0.8	7.6	1.9
75	02	06	EA-C	70	11	5.9	45	6	24	3.7	2.7	8.7	4.9
75	02	06	MLA-GAM			81.6							
75	03	06	EA-C	80	12	17.5	50	6	15	14.4	3.6	11.4	15.6
75	03	06	MLA-GAM			85.2							
75	04	06	EA-C	69	10	29.9	40	7	13	26.0	4.6	9.4	27.1
75	04	06	MLA-GAM			110.0							
75	05	06	EA-C	76	11	26.1	40	7	15	21.0	4.1	10.3	22.9
75	05	06	MLA-GAM			95.0							
75	02	06	EA-0900				47		23	2.3	3.6	7.3	4.3
75	02	06	EA-1200				37		14	0.7	2.0	10.4	1.6
75	02	06	EA-1500				39		13	2.4	2.5	10.7	3.4
75	02	06	EA-1800				44		16	4.5	2.5	9.2	5.4
75	02	06	EA-2100				43		17	4.3	3.1	10.3	5.3
75	02	06	EA-2400				41		16	4.0	3.8	9.7	5.0
75	03	06	EA-0300				40		18	3.4	4.0	9.4	4.3
75	03	06	EA-0600				41		18	3.0	3.8	9.6	3.7
75	03	06	EA-0900				42		13	1.0	2.7	10.4	2.3
75	03	06	EA-1200				38		11	2.9	3.1	11.0	3.8
75	03	06	EA-1500				42		21	8.6	3.5	11.5	9.5
75	03	06	EA-1800				39		20	13.6	3.4	11.7	15.2
75	03	06	EA-2100				46		12	17.1	3.9	11.2	18.9
75	03	06	EA-2400				47		16	19.7	4.7	10.9	21.6
75	04	06	FA-0300				48		16	20.3	4.9	12.4	22.7
75	04	06	EA-0600				45		15	20.3	4.1	12.0	22.9
75	04	06	EA-0900				44		13	21.1	3.2	11.5	22.0
75	04	06	EA-1200				47		11	20.0	3.9	15.1	22.8

ANALYSES

			SAMPLE	UNFILTERED			FILTERED						
YEAR	DAY	MON	DESIGNATION	COD	BOD	TKN	COD	BOD	FOC	NH3N	NO2N	NO3N	TKN
75	04	06	EA-1500				62		11	22.0	3.3	13.7	24.1
75	04	06	EA-1800				47		16	23.0	3.6	13.4	25.8
75	04	06	EA-2100				47		14	24.0	5.2	11.8	27.0
75	04	06	EA-2400				58		15	25.0	6.2	8.8	28.1
75	05	06	EA-0300				51		14	24.0	6.4	9.6	27.2
75	05	06	EA-0600				44		12	23.0	6.0	11.0	25.8
75	05	06	EA-0900				32		56	20.0	3.5	9.8	21.3
75	05	06	EA-1200				36		14	19.0	5.0	11.0	20.4
75	05	06	EA-1500				40		17	20.0	4.4	12.6	20.6
75	05	06	EA-1800				32		17	20.0	5.2	12.8	21.1
75	05	06	EA-2100				28		18	20.0	4.9	12.1	20.7
75	05	06	EA-2400				40		16	20.0	4.7	11.3	21.6
75	06	06	EA-0300				32		15	19.0	4.3	13.7	20.9
75	06	06	EA-0600				36		14	16.0	0.7	17.3	18.5
75	01	07	EA-C	59	14	3.2	47	2	14	0.7	1.1	27.9	1.1
75	01	07	MLA-GAM			35.0							
75	02	07	EA-C	78	19	10.1	50	4	23	7.1	2.6	47.4	8.7
75	02	07	MLA-GAM			79.7							
75	03	07	EA-C	63	8	3.6	49	3	14	0.7	0.6	16.3	2.6
75	03	07	MLA-GAM			100.2							
75	01	07	EA-0900				35		12	0.3	0.1	12.9	1.1
75	01	07	EA-1100				43		14	0.3	0.1	13.9	1.3
75	01	07	EA-1300				46		13	0.4	0.1	13.9	1.5
75	01	07	EA-1500				49		14	0.5	0.4	14.6	1.4
75	01	07	EA-1700				50		14	0.7	1.4	15.6	1.7
75	01	07	EA-1900				50		13	1.1	2.7	17.3	2.1
75	01	07	EA-2100				51		17	0.9	3.1	19.9	2.3
75	01	07	EA-2300				48		20	0.6	2.7	18.6	2.1
75	02	07	EA-0100				51		18	0.9	1.4	18.6	2.2
75	02	07	EA-0300				46		16	0.6	0.8	12.2	1.9
75	02	07	EA-0500				44		15	0.7	0.7	17.3	1.9
75	02	07	EA-0700				44		16	0.7	0.6	16.4	1.6
75	02	07	EA-0900				43		14	0.7	0.3	11.4	2.0
75	02	07	EA-1100				97		14	1.0	1.6	13.7	2.8
75	02	07	EA-1300				44		14	4.9	2.3	15.7	7.0
75	02	07	EA-1500				47		16	11.0	3.0	14.0	12.0
75	02	07	EA-1700				50		14	14.3	3.8	16.8	16.4
75	02	07	EA-1900				51		16	17.0	3.9	16.1	18.5
75	02	07	EA-2100				51		15	13.8	4.3	16.7	15.2
75	02	07	EA-2300				50		14	7.1	4.9	20.1	8.7
75	03	07	EA-0100				48		13	0.6	3.3	22.7	2.7
75	03	07	EA-0300				43		14	0.9	1.3	14.7	1.4
75	03	07	EA-0500				37		15	0.7	0.6	15.4	1.8
75	03	07	EA-0700				38		13	0.4	0.5	14.5	1.3
75	03	07	EA-0900				47		12	0.7	0.3	15.7	1.7
75	03	07	EA-1100				49		12	0.4	0.3	16.7	1.4
75	03	07	EA-1300				49		13	0.4	0.5	15.5	1.5
75	03	07	EA-1500				51		12	0.4	0.6	17.4	1.7

ANALYSES

YEAR	DAY	MON	SAMPLE DESIGNATION	UNFILTERED COD	UNFILTERED BOD	UNFILTERED TKN	FILTERED COD	FILTERED BOD	FILTERED FOC	FILTERED NH3N	FILTERED NO2N	FILTERED NO3N	FILTERED TKN
75	03	07	EA-1700				45		12	0.5	0.9	14.1	1.2
75	03	07	EA-1900				45		13	0.6	1.5	14.5	0.9
75	03	07	EA-2100				46		12	0.7	1.3	14.7	1.3
75	03	07	EA-2300				44		12	0.6	0.9	12.1	1.5
75	04	07	EA-0100				44		11	0.5	0.6	13.4	1.0
75	04	07	EA-0300				42		14	0.5	0.4	12.6	1.5
75	04	07	EA-0500				46		12	0.6	0.5	11.5	2.0
75	04	07	EA-0700				44		14	0.5	0.5	11.5	1.6
73	09	11	EB1-0900	120.0		12.3	34.4			10.6	0.4	3.8	10.6
73	09	11	EB1-1200				36.5			15.2	0.5	4.9	15.3
73	09	11	EB1-1500	183.0		26.0	54.2			25.6	0.1	0.2	25.6
73	10	11	EB1-1045				45.0			13.2	1.2	13.8	13.2
73	11	11	EB1-1100				40.1			15.0	0.3	2.9	15.0
73	14	11	EB1-C	79.6		11.5	53.9		18	11.0	0.1	0.7	11.0
73	14	11	MLB1-GAM			140.0							
73	15	11	EB1-C	141.0	59	14.4	46.7	10	15	11.0	0.2	2.0	11.0
73	15	11	MLB1-GAM			147.0							
73	19	11	EB1-C	992.0	426	45.8	94.4	13	19	14.2	0.1	2.7	14.2
73	19	11	MLB1-GAM			149.0							
73	20	11	EB1-C	313.0		22.7	44.4		13	14.3	0.1	1.2	14.3
73	20	11	MLB1-GPM			150.0							
73	21	11	EB1-C	81.1		12.6	38.6		18	14.3	0.1	2.2	14.3
73	21	11	MLB1			135.0							
73	27	11	EB1-C	57.9	43	15.8	37.5	15	16	14.0	0.2	1.1	14.0
73	27	11	MLB1-GAM			134.0							
73	29	11	EB1-C	119.0	38	13.3	39.4	13	16	10.4	0.2	1.6	10.4
73	29	11	MLB1-GAM			193.0							
74	28	01	EB1-GAM	45.0		4.9	33.3			3.8	0.1	3.4	4.9
74	29	01	MLB1-GAM			134.0							
74	29	01	EB1-C	87.2	27	12.6	42.9	20	9	10.5	0.1	0.6	10.5
74	31	01	EB1-C	62.4	14	13.5	34.4	5	19	11.8	0.4	1.2	11.8
74	31	01	MLB1-0900			150.0							
74	31	01	MLB1-1500			198.0							
74	31	01	MLB1-1800			188.0							
74	31	01	MLB1-2100			186.0							
74	31	01	EB1-C1	45.0	24	6.8	30.6	9	7	6.4	0.3	2.9	5.6
74	31	01	EB1-C2	59.3	23	14.1	35.0	13	7	12.2	0.2	2.5	12.3
74	31	01	EB1-C3	76.0	24	16.0	43.3	15	9	15.0	0.2	1.9	15.3
74	31	01	EB1-C4	101.1	46	16.5	52.6	20	11	12.7	0.3	1.3	12.7
74	31	01	EB1-C5	99.2	48	18.5	48.5	21	11	13.9	0.3	2.6	13.9
74	01	02	EB1-C6	90.7	39	17.0	39.8	16	8	13.1	0.2	0.7	13.2
74	01	02	EB1-C7	94.3	42	14.7	38.3	21	8	11.1	0.2	1.3	11.1
74	01	02	EB1-C8	202.5	21	15.1	30.2	15	6	8.6	0.1	1.9	8.6
74	04	02	MLB1-0900			162.0							
74	04	02	MLB1-1500			168.0							
74	04	02	EB1-C1	58.4	23	9.1	43.7	18	11	8.0	0.2	2.0	8.2
74	04	02	EB1-C2	57.9	28	17.0	36.3	11	13	15.1	0.3	1.9	15.1
74	04	02	EB1-C3	76.6	47	22.0	47.1	19	11	19.0	0.2	0.8	19.0

ANALYSES

YEAR	DAY	MON	SAMPLE DESIGNATION	UNFILTERED COD	UNFILTERED BOD	UNFILTERED TKN	FILTERED COD	FILTERED BOD	FILTERED FOC	FILTERED NH3N	FILTERED NO2N	FILTERED NO3N	FILTERED TKN
74	04	02	EB1-C4	128.0	57	21.2	52.7	40	16	15.9	0.1	0.1	15.9
74	04	02	EB1-C5	169.0	89	19.1	59.1	49	16	15.7	0.0	0.0	15.7
74	05	02	EB1-C6	145.0	76	17.8	61.4	49	21	15.2	0.0	0.0	15.2
74	05	02	EB1-C7	136.0	95	17.0	46.0	48	16	14.4	0.0	0.1	14.4
74	05	02	EB1-C8	81.0	41	12.9	55.0	24	10	10.9	0.0	0.9	10.9
74	04	02	EB1-C	108.0	26	16.5	45.0	13	12	14.3	0.1	0.7	14.3
74	05	02	EB1-C1				46.0			6.6	0.2	2.2	6.6
74	05	02	EB1-C2				46.0			11.8	0.3	1.4	11.8
74	05	02	EB1-C3				48.0			15.7	0.3	0.4	15.7
74	05	02	EB1-C4				63.0			15.2	0.1	0.2	15.2
74	05	02	EB1-C5				65.0			16.3	0.1	0.1	16.3
74	06	02	EB1-C6				60.0			14.9	0.1	0.1	14.9
74	06	02	EB1-C7				54.0			13.6	0.1	0.1	13.6
74	06	02	EB1-C8				49.0			10.2	0.4	1.5	10.2
74	05	02	EB1-C				54.0			11.9	0.1	1.1	11.9
74	05	02	MLB1-0900			152.0							
74	11	02	EB1-C	106.0	26	17.4	68.0	13	60	15.4	0.1	1.8	15.4
74	11	02	MLB1-GAM			113.0							
74	13	02	EB1-C	155	16	15.0	123	6	8	12.7	0.5	2.4	12.7
74	13	02	MLB1-GAM			176.0							
74	19	02	EB1-C	190	29	21.1	111	13	14	17.4	0.2	1.5	17.4
74	19	02	MLB1-GAM			116.0							
74	21	02	MLB1-GAM			152.0							
74	21	02	EB1-C	114	30	17.4	75	12	10	15.9	0.3	1.6	15.9
74	27	02	MLB1-GAM			140.0							
74	27	02	EB1-C	73	12	22.5	58	3	9	19.8	0.8	1.9	19.8
74	01	03	EB1-C	75	12	28.2	56	4	9	28.2	0.8	1.2	28.2
74	01	03	MLB1-GAM			220.0							
74	04	03	EB1-C1				70			11.5	1.2	2.4	11.5
74	04	03	EB1-C2				72			19.2	1.0	1.4	19.2
74	04	03	EB1-C3				71			16.3	0.9	1.5	16.4
74	04	03	EB1-C4				77			13.6	0.9	1.2	13.6
74	05	03	EB1-C5				62			8.6	0.8	1.8	8.6
74	05	03	EB1-C6				55			2.7	0.6	3.1	3.1
74	04	03	EB1-C	116		21.8							
74	04	03	EB1-0900	64		6.7	48			4.7	1.2	2.1	4.7
74	04	03	MLB1-0900			125.0							
74	05	03	EB1-CC1				37			7.4	0.6	2.2	7.4
74	05	03	EB1-CC2				35			8.1	0.6	1.6	8.1
74	06	03	EB1-CC3				34			6.5	0.4	2.5	6.5
74	05	03	EB1-C	120		14.0							
74	06	03	EB1-CC1				31			9.9	0.3	2.0	9.9
74	06	03	EB1-CC2				38			10.3	0.3	1.4	10.3
74	07	03	EB1-CC3				29			7.5	0.2	2.1	7.5
74	06	03	EB1-C	121		14.8							
74	06	03	MLB1-GAM			132.0							
74	15	03	MLB1-GAM			131.0							
74	15	03	EB1-C	91.3	21	14.5	41.5	10	28	12.1	0.2	2.6	12.1

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YEAR	DAY	MON	SAMPLE DESIGNATION	UNFILTERED COD	UNFILTERED BOD	UNFILTERED TKN	FILTERED COD	FILTERED BOD	FILTERED FOC	FILTERED NH3N	FILTERED NO2N	FILTERED NO3N	FILTERED TKN
74	25	03	MLB1-GAM			170.0							
74	25	03	EB1-C	87	22	20.9	45	10	18	20.2	0.2	2.7	20.2
74	03	04	MLB1-GAM			145.0							
74	03	04	EB1-C	107	30	21.8	49	13	15	24.3	0.7	8.0	24.3
74	05	04	MLB1-GAM			110.0							
74	05	04	EB1-C	57	9	20.7	33	6	10	20.6	0.6	2.9	20.6
74	NO		EB1-C3 UNFILTERED SAMPLE (09/04/74)										
74	NO		EB1-C7 DUE TO SAMPLER BREAKDOWN,EB1-C8 IS AN 0800 HOUR GRAB										
74	09	04	MLB1-0900			105.0							
74	09	04	MLB1-1500			140.0							
74	09	04	EB1-C1	77	14	8.2	53	10	13	7.9	1.5	3.5	7.9
74	09	04	EB1-C2	65	9	21.3	41	7	8	20.5	1.9	3.4	20.5
74	09	04	EB1-C3	69	9	30.0	49	4	10	28.4	1.7	2.2	28.4
74	09	04	EB1-C4	73	13	33.3	53	4	13	31.0	1.4	2.2	31.0
74	09	04	EB1-C5	77	31	32.5	53	6	14	28.1	1.3	1.9	28.1
74	10	04	EB1-C6	69	11	31.9	49	4	15	28.7	1.3	1.8	28.7
74	10	04	EB1-C8	61		15.6	41	4	7	13.2	1.8	12.9	13.2
74	09	04	EB1-C	61	11	26.6	49	5	20	23.0	1.3	3.9	23.0
74	10	04	MLB1-0900			179.0							
74	10	04	MLB1-1500			152.0							
74	10	04	EB1-C1	41	7	21.9	33	4	8	19.3	1.6	4.3	19.3
74	10	04	EB1-C2	69	10	28.4	29	3	8	25.4	2.1	3.5	25.4
74	10	04	EB1-C3	53	9	32.2	33	5	11	28.6	1.8	2.6	28.6
74	10	04	EB1-C4	69	10	30.8	37	6	13	28.5	1.5	2.3	28.6
74	10	04	EB1-C5	61	11	28.5	41	7	11	27.7	1.6	2.1	27.7
74	11	04	EB1-C6	57	9	30.1	37	6	12	27.9	1.6	1.6	27.9
74	11	04	EB1-C7	33	16	28.6	41	6	11	25.9	1.8	1.4	25.9
74	11	04	EB1-C8	53	9	27.7	33	3	10	24.8	1.8	2.8	24.8
74	10	04	EB1-C	65	8	29.3	37	4	10	26.0	1.7	2.6	26.1
74	16	04	MLB1-GAM			75.0							
74	16	04	EB1-C	116	31	17.3	52	12	15	12.7	0.6	1.2	12.7
74	18	04	MLB1-GAM			94.0							
74	18	04	EB1-C	173	11	26.5	48	13	13	20.9	0.4	1.8	20.9
74	23	04	MLB1-GAM			133.0							
74	23	04	EB1-C	72	24	21.0	52	8	12	20.9	0.4	1.5	20.9
74	25	04	MLB1-GAM			102.0							
74	25	04	EB1-C	84	24	25.8	64	14	18	23.8	0.5	1.8	23.8
74	30	04	MLB1-1500			93.0							
74	30	04	MLB1-0900			85.0							
74	30	04	EB1-C1	60	7	14.0	36	3	9	12.2	3.0	3.3	12.5
74	30	04	EB1-C2	56	8	31.5	36	2	9	28.5	3.2	2.8	28.5
74	30	04	EB1-C3	56	10	40.5	44	3	12	36.9	3.0	2.4	36.9
74	30	04	EB1-C4	76	12	39.6	52	4	13	39.1	1.2	0.7	39.1
74	30	04	EB1-C5	76	11	39.8	56	4	13	38.7	1.5	1.7	38.7
74	01	05	EB1-C6	76	12	39.3	48	5	13	37.6	1.4	1.4	37.6
74	01	05	EB1-C7	64	9	37.0	52	2	12	35.5	1.5	2.1	35.8
74	01	05	EB1-C8	60	9	35.7	40	4	11	34.6	1.9	5.0	34.6
74	30	04	EB1-C	36	10	34.1	56	6	11	33.0	2.4	3.1	33.1

ANALYSES

YEAR	DAY	MON	SAMPLE DESIGNATION	UNFILTERED COD	UNFILTERED BOD	UNFILTERED TKN	FILTERED COD	FILTERED BOD	FILTERED FOC	FILTERED NH3N	FILTERED NO2N	FILTERED NO3N	FILTERED TKN
74	01	05	MLB1-0900			113.0							
74	01	05	MLB1-1500			136.0							
74	01	05	EB1-C9	44	39	32.0	25	4	10	31.4	2.6	4.2	31.4
74	01	05	EB1-C10	51	39	42.9	38	7	10	40.3	3.3	3.8	40.3
74	01	05	EB1-C11	55	40	52.4	38	5	13	48.6	2.8	2.5	48.7
74	01	05	EB1-C12	108	38	52.4	46	5	18	48.8	2.0	1.3	49.0
74	01	05	EB1-C13	59	33	48.3	46	5	17	45.0	1.1	0.3	45.1
74	02	05	EB1-C14	55	24	47.8	42	5	11	44.2	0.3	0.1	44.2
74	02	05	EB1-C15	67	22	44.7	38	3	15	43.4	0.3	0.3	43.5
74	02	05	EB1-C16	71	26	41.1	34	3	12	39.4	1.5	1.5	39.4
74	01	05	EB1-C	63	35	44.4	34	4	13	43.4	1.8	1.7	43.5
74	14	05	EB1-C	28	14	29.8	32	8	10	28.5	0.4	1.7	28.5
74	14	05	MLB1-GAM			30.0							
74	16	05	MLB1-GAM			116.0							
74	16	05	EB1-C	65	17	29.7	34	7	14	27.4	0.5	4.0	27.4
74	21	05	EB1-C	129	38	17.0	50	17	20	12.8	0.5	3.6	12.8
74	21	05	MLB1-GAM			53.0							
74	23	05	EB1-C	132	37	18.7	38	3	14	9.6	0.7	7.7	9.6
74	23	05	MLB1-GAM			113.0							
74	04	06	MLB1-GAM			103.0							
74	04	06	EB1-C	151	24	20.0	62	41	26	19.3	0.2	1.6	19.3
74	06	06	EB1-C	151	43	20.7	65	20	26	20.0	0.2	1.2	20.0
74	06	06	MLB1-GAM			121.0							
74	13	06	MLB1-GAM			213.0							
74	13	06	EB1-C	102	14	26.0	78	9	17	25.7	0.0	0.2	25.7
74	18	06	MLB1-GAM			136.0							
74	18	06	EB1-C	67	7	17.8	35	5	13	16.1	0.3	1.1	16.1
74	20	06	EB1-C	61	12	17.0	42	7	14	15.8	0.4	1.0	15.8
74	26	06	MLB1-GAM			243.0							
74	26	06	EB1-C	33	6	17.0	31	5	9	16.8	2.4	5.2	16.8
74	28	06	MLB1-GAM			280.0							
74	28	06	EB1-C	95	15	29.3	54	6	16	26.7	0.5	1.5	26.7
74	02	07	MLB1-GAM			115.0							
74	02	07	EB1-C	79	10	26.9	50	8	19	25.2	1.3	2.1	25.2
74	05	07	MLB1-GAM			107.0							
74	05	07	EB1-C	84	16	30.9	42	10	27	30.4	0.3	0.7	30.4
74	10	07	EB1-C	232	93	20.4	68	24	29	14.7	0.0	0.7	14.7
74	10	07	MLB1-GAM			87.0							
74	12	07	EB1-C	203	64	20.7	72	27	28	16.2	0.0	0.6	16.2
74	12	07	MLB1-GAM			129.0							
74	16	07	EB1-C	102	30	30.3	97	18	20	27.5	0.1	0.5	27.6
74	16	07	MLB1-GAM			173.0							
74	18	07	EB1-C	148	29	30.0	51	11	18	27.0	0.1	2.4	27.0
74	18	07	MLB1-GAM			150.0							
74	22	07	EB1-C	110	27	27.6	55	15	14	24.0	0.1	0.2	26.0
74	22	07	MLB1-GAM			147.0							
74	30	07	EB1-C	75	16	45.8	42	9	16	41.0	0.5	4.0	44.8
74	30	07	MLB1-GAM			198.0							

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YEAR	DAY	MON	SAMPLE DESIGNATION	UNFILTERED COD	UNFILTERED BOD	UNFILTERED TKN	FILTERED COD	FILTERED BOD	FILTERED FOC	FILTERED NH3N	FILTERED NO2N	FILTERED NO3N	FILTERED TKN
74	06	08	EB1-C	52	10	33.3	24	7	15	29.5	0.7	1.9	31.8
74	06	08	MLB1-GAM			196.0							
74	08	08	EB1-C	60	17	37.7	24	10	18	34.9	0.5	1.0	34.9
74	08	08	MLB1-GAM			201.0							
74	13	08	EB1-C	36	6	29.6	24	4	13	27.0	2.7	5.8	28.6
74	13	08	MLB1-GAM			113.0							
74	15	08	EB1-C	53	7	31.7	33	4	11	28.5	3.2	4.9	30.5
74	15	08	MLB1-GAM			218.0							
74	20	08	EB1-C	74	6	26.1	53	20	22	22.0	0.1	0.2	22.3
74	20	08	MLB1-GAM			87.0							
74	22	08	EB1-C	86	21	37.0	37	12	22	31.0	0.2	1.4	33.6
74	22	08	MLB1-GAM			272.0							
74	29	08	EB1-C	160	40	29.7	49	20	22	18.0	0.1	0.1	24.0
74	29	08	MLB1-GAM			185.0							
74	06	09	EB1-C	50	11	47.7	33	6	15	45.0	0.2	0.9	45.2
74	06	09	MLB1-GAM			235.0							
74	10	09	EB1-C	58	9	47.3	41	5	26	44.6	0.3	1.8	44.6
74	10	09	MLB1-GAM			270.0							
74	12	09	EB1-C	59	9	52.5	45	5	18	48.0	1.0	0.1	51.1
74	12	09	MLB1-GAM			249.0							
74	17	09	EB1-C	127	20	47.4	39	5	16	42.5	0.3	1.2	42.5
74	17	09	MLB1-GAM			297.0							
74	19	09	EB1-C	77	13	46.1	53	7	21	40.3	0.0	1.0	40.3
74	19	09	MLB1-GAM			266.0							
74	25	09	EB1-C	109	15	44.1	40	4	15	40.0	0.1	5.9	40.0
74	25	09	MLB1-GPM			337.0							
74	27	09	EB1-C	69	10	42.5	46	12	20	39.0	0.1	1.3	39.5
74	27	09	MLB1-GPM			297.0							
74	03	10	EB1-C	159	38	27.6	51	18	29	21.0	0.1	0.5	21.8
74	03	10	MLB1-GPM			207.0							
74	08	10	EB1-C	144	35	30.5	38	13	25	23.5	0.2	0.8	24.0
74	08	10	MLB1-GAM			263.0							
74	10	10	EB1-C	160	41	31.5	99	20	32	24.5	0.1	0.8	25.9
74	10	10	MLB1-GAM			287.0							
74	18	10	MLB1-GAM			232.0							
74	18	10	EB1-C	445	60	58.3	48	10	24	40.8	0.2	0.2	40.8
74	25	10	MLB1-GAM			273.0							
74	25	10	EB1-C	74	13	44.5	44	5	23	38.0	0.0	1.1	41.8
74	28	10	EB1-C	71	12	45.9	42	6	20	40.5	0.4	2.3	43.8
74	28	10	MLB1-GAM			232.0							
74	04	11	EB1-C	76	19	54.6	38	8	24	51.5	0.3	3.0	52.6
74	04	11	MLB1-GAM			205.0							
74	06	11	EB1-C	67	10	57.1	46	10	16	49.5	0.2	3.3	53.9
74	06	11	MLB1-GAM			171.0							
74	13	11	EB1-C	70	12	76.5	49	6	16	66.0	0.7	3.9	75.5
74	13	11	MLB1-GAM			202.0							
74	15	11	EB1-C	53	7	69.0	41	5	14	68.0	0.6	11.2	68.3
74	15	11	MLB1-GAM			234.0							

ANALYSES

YEAR	DAY	MON	SAMPLE DESIGNATION	UNFILTERED COD	UNFILTERED BOD	UNFILTERED TKN	FILTERED COD	FILTERED BOD	FILTERED FOC	FILTERED NH3N	FILTERED NO2N	FILTERED NO3N	FILTERED TKN
74	25	11	EB1-C	87	21	36.5	41	10	15	21.0	0.2	2.7	32.2
74	25	11	MLB1-GAM			92.0							
74	27	11	EB1-C	91	46	35.8	41	17	28	28.0	0.1	3.0	32.5
74	27	11	MLB1-GAM			177.0							
75	10	02	EB1-C	168	42	27.4	64	16	25	15.0	0.2	3.3	21.9
75	10	02	NO MLSS TKN TAKEN										
75	20	02	EB1-C	106	19	33.7	64	9	21	32.0	0.4	13.3	32.0
75	20	02	MLB1-GAM			150.0							
75	26	02	EB1-C	95	16	34.8	67	10	19	32.0	0.6	14.4	32.9
75	26	02	EB1-C SAMPLE IS MISSING 1300 - 1600 HRS DUE TO SAMPLER ERROR										
75	26	02	MLB1-GAM			45.0							
75	03	03	EB1-C	148	26	19.0	58	8	20	13.0	0.7	9.3	16.0
75	03	03	MLB1-GAM			28.0							
75	04	03	EB1-C	183	33	24.0	71	13	20	14.0	0.6	3.3	19.0
75	04	03	MLB1-GAM			20.0							
75	05	03	EB1-C	221	42	25.9	58	20	26	16.0	0.5	1.7	18.5
75	05	03	MLA-GAM			104.0							
75	06	03	NO MLSS TKN TAKEN										
75	06	03	EB1-C	218	43	25.8	58	16	24	15.0	0.5	0.9	19.7
75	07	03	EB1-C	212	42	25.5	67	17	23	16.0	0.4	1.4	18.1
75	07	03	MLB1-GAM			30.0							
75	08	03	MLB1-GAM			38.0							
75	03	03	EB1-0900				51			13.0	0.6	12.4	14.0
75	03	03	EB1-1200				56			13.0	0.8	11.1	14.3
75	03	03	EB1-1500				63			17.0	0.7	9.0	18.0
75	03	03	EB1-1800				72			17.0	0.7	3.1	18.4
75	03	03	EB1-2100				78			16.0	0.7	7.7	17.6
75	03	03	EB1-2400				76			15.0	0.6	8.0	15.9
75	04	03	EB1-0300				64			12.0	0.7	9.1	14.6
75	04	03	EB1-0600				53			11.0	0.6	9.3	14.1
75	04	03	EB1-0900				46			10.4	0.7	3.3	11.8
75	04	03	EB1-1200				70			12.7	0.6	2.7	14.6
75	04	03	EB1-1500				68			13.0	0.7	2.9	18.5
75	04	03	EB1-1800				67			19.0	0.7	3.7	22.2
75	04	03	EB1-2100				70			17.0	0.7	2.8	20.5
75	04	03	EB1-2400				72			17.0	0.6	2.6	21.0
75	05	03	EB1-0300				61			16.0	0.4	2.3	19.0
75	05	03	EB1-0600				54			14.0	0.3	1.9	17.3
75	05	03	EB1-0900				47			11.7	0.5	2.1	14.7
75	05	03	EB1-1200				43			13.4	0.5	2.1	14.9
75	05	03	EB1-1500				50			15.0	0.5	1.7	18.9
75	05	03	EB1-1800				76			17.0	0.4	1.1	21.7
75	05	03	EB1-2100				81			16.0	0.4	1.5	20.6
75	05	03	EB1-2400				73			14.0	0.4	1.4	20.3
75	06	03	EB1-0300				66			15.0	0.4	1.3	18.4
75	06	03	EB1-0600				68			13.0	0.4	1.3	17.2
75	06	03	EB1-1000				54			12.0	0.3	1.2	12.3
75	06	03	EB1-1200				54			15.0	0.3	1.0	15.2

ANALYSES

SAMPLE				UNFILTERED			FILTERED						
YEAR	DAY	MON	DESIGNATION	COD	BOD	TKN	COD	BOD	FOC	NH3N	NO2N	NO3N	TKN
75	06	03	EB1-1500				59			17.0	0.4	1.4	17.9
75	06	03	EB1-1800				76			19.0	0.6	1.3	21.7
75	06	03	EB1-2100				26			19.0	0.6	1.0	20.3
75	06	03	EB1-2400				74			16.0	0.5	0.8	18.0
75	07	03	EB1-0300				67			15.0	0.4	0.7	16.3
75	07	03	EB1-0600				53			14.0	0.4	0.6	16.3
75	07	03	EB1-0900				47			11.3	0.3	0.8	11.3
75	07	03	EB1-1200				44			13.0	0.4	0.9	13.8
75	07	03	EB1-1500				53			18.0	0.5	0.6	18.6
75	07	03	EB1-1800				71			18.0	0.5	0.8	20.1
75	07	03	EB1-2100				100			16.0	0.4	1.7	20.3
75	07	03	EB1-2400				60			18.0	0.4	1.4	20.0
75	08	03	EB1-0300				60			17.0	0.3	0.8	17.7
75	08	03	EB1-0600				51			16.0	0.2	0.8	16.4
75	11	03	EB1-C	145	19	22.8	55	8	20	17.0	0.4	2.7	18.6
75	11	03	MLB1-GAM			77.0							
75	12	03	EB1-C	214	47	25.1	65	19	28	15.0	0.3	1.4	19.6
75	12	03	MLB1-GAM			58.0							
75	13	03	EB1-C	254	47	24.3	64	26	28	15.0	0.2	0.7	17.1
75	13	03	MLB1-GAM			48.0							
75	14	03	EB1-C	156	36	21.1	74	21	25	17.0	0.3	1.2	18.9
75	14	03	MLB1-GAM			38.0							
75	15	03	EB1-C	112	19	17.9	60	6	18	13.3	0.3	1.7	15.7
75	15	03	MLB1-GAM			57.0							
75	16	03	EB1-C	103	14	17.6	49	7	17	11.7	0.3	3.5	13.3
75	16	03	MLB1-GAM			53.0							
75	17	03	EB1-C	93	14	17.3	57	9	21	11.9	0.4	3.2	13.1
75	17	03	MLB1-GAM			60.0							
75	18	03	EB1-C	128	23	17.0	45	10	21	12.3	0.6	3.3	14.2
75	18	03	MLB1-GAM			59.0							
75	19	03	MLB1-GAM			38.0							
75	11	03	EB1-0900				47			11.6	0.3	0.8	17.8
75	11	03	EB1-1200				40			12.9	0.5	2.6	14.5
75	11	03	EB1-1500				48			18.0	0.7	2.3	20.0
75	11	03	EB1-1800				64			21.0	0.5	1.2	23.5
75	11	03	EB1-2100				75			21.0	0.5	1.8	23.4
75	11	03	EB1-2400				69			20.0	0.4	1.4	22.3
75	12	03	EB1-0300				55			17.0	0.3	0.9	19.1
75	12	03	EB1-0600				59			12.3	0.3	1.6	13.6
75	12	03	EB1-0900				53			10.8	0.3	1.8	13.1
75	12	03	EB1-1200				49			13.5	0.4	1.8	16.8
75	12	03	EB1-1500				49			15.0	0.6	2.1	22.5
75	12	03	EB1-1800				64			19.0	0.4	1.4	24.8
75	12	03	EB1-2100				79			18.0	0.3	0.6	24.1
75	12	03	EB1-2400				132			15.0	0.4	0.5	23.5
75	13	03	EB1-0300				103			13.7	0.1	0.5	20.4
75	13	03	EB1-0600				94			13.0	0.3	0.9	18.9
75	13	03	EB1-0900				73			10.5	0.1	1.7	15.0

ANALYSES

YEAR	DAY	MON	SAMPLE DESIGNATION	UNFILTERED COD	UNFILTERED BOD	UNFILTERED TKN	FILTERED COD	FILTERED BOD	FILTERED FOC	FILTERED NH3N	FILTERED NO2N	FILTERED NO3N	FILTERED TKN
75	13	03	EB1-1200				42			12.7	0.4	1.2	14.3
75	13	03	EB1-1500				48			15.0	0.4	0.8	19.3
75	13	03	EB1-1800				63			19.0	0.1	0.5	21.4
75	13	03	EB1-2100				82			17.0	0.3	0.7	19.5
75	13	03	EB1-2400				70			15.0	0.2	0.9	18.1
75	14	03	EB1-0300				48			13.0	0.1	0.8	15.9
75	14	03	EB1-0600				48			12.4	0.2	0.8	13.1
75	14	03	EB1-0900				52			10.0	0.2	1.1	13.7
75	14	03	EB1-1200				52			10.4	0.3	1.7	13.2
75	14	03	EB1-1500				51			18.0	0.3	1.3	20.7
75	14	03	EB1-1800				78			22.0	0.4	2.1	24.9
75	14	03	EB1-2100				90			24.0	0.0	0.0	26.3
75	14	03	EB1-2400				75			19.0	0.2	1.1	21.5
75	15	03	EB1-0300				68			17.0	0.2	1.0	19.9
75	15	03	EB1-0600				64			16.0	0.1	1.0	18.4
75	18	03	EB1-0900				47			7.7	0.4	4.2	9.6
75	18	03	EB1-1200				43			8.4	0.3	3.9	10.7
75	18	03	EB1-1500				48			13.6	0.5	3.3	15.9
75	18	03	EB1-1800				55			16.0	0.5	2.4	19.9
75	18	03	EB1-2100				58			16.0	0.6	3.6	19.6
75	18	03	EB1-2400				62			13.8	0.5	2.7	15.7
75	19	03	EB1-0300				55			12.2	0.4	2.2	14.1
75	19	03	EB1-0600				46			10.5	0.4	2.5	13.0
75	24	03	EB1-C	52	7	8.1	33	6	15	7.2	0.7	3.7	8.1
75	24	03	HLB1-GAM			37.0							
75	25	03	EB1-C	92	17	12.4	44	8	14	8.1	0.6	2.9	10.3
75	25	03	HLB1-GAM			29.0							
75	26	03	EB1-C	86	16	12.1	41	6	14	9.4	0.7	3.1	10.2
75	26	03	HLB1-GAM			24.0							
75	27	03	EB1-C	97	13	12.0	47	3	14	9.9	0.7	2.3	9.9
75	27	03	HLB1-GAM			37.0							
75	24	03	EB1-0900				37			7.4	0.5	3.3	9.1
75	24	03	EB1-1200				27			6.0	0.4	3.9	7.9
75	24	03	EB1-1500				29			8.5	0.7	3.2	9.6
75	24	03	EB1-1800				31			8.8	0.9	2.9	9.9
75	24	03	EB1-2100				33			7.1	0.8	2.6	8.6
75	24	03	EB1-2400				31			6.0	0.7	3.2	7.9
75	25	03	EB1-0300				32			5.5	0.6	3.4	6.2
75	25	03	EB1-0600				30			5.0	0.5	3.4	6.3
75	25	03	EB1-0900				29			3.0	0.4	3.9	3.2
75	25	03	EB1-1200				28			5.8	0.4	3.5	6.4
75	25	03	EB1-1500				44			12.8	0.8	2.2	13.4
75	25	03	EB1-1800				52			11.6	0.7	1.5	12.3
75	25	03	EB1-2100				44			8.9	0.8	2.0	9.6
75	25	03	EB1-2400				43			7.7	0.7	1.9	8.4

ANALYSES

YEAR	DAY	MON	SAMPLE DESIGNATION	UNFILTERED COD	UNFILTERED BOD	UNFILTERED TKN	FILTERED COD	FILTERED BOD	FILTERED FOC	FILTERED NH3N	FILTERED NO2N	FILTERED NO3N	FILTERED TKN
75	26	03	EB1-0300				41			7.5	0.6	1.9	8.3
75	26	03	EB1-0600				40			6.9	0.5	1.9	7.6
75	26	03	EB1-0900				44			4.9	0.5	3.3	5.3
75	26	03	EB1-1200				40			5.8	0.6	3.2	6.7
75	26	03	EB1-1500				40			10.4	0.9	4.4	11.1
75	26	03	EB1-1800				48			12.4	1.4	3.3	13.3
75	26	03	EB1-2100				53			11.0	0.8	2.1	12.1
75	26	03	EB1-2400				53			9.9	0.7	2.0	10.3
75	27	03	EB1-0300				46			9.5	0.6	1.8	10.1
75	27	03	EB1-0600				47			9.0	0.6	1.7	10.9
75	27	03	EB1-0900				32			5.7	0.5	3.6	6.3
75	27	03	EB1-1200				29			6.7	0.6	2.8	7.8
75	27	03	EB1-1500				36			10.6	0.6	2.4	11.8
75	27	03	EB1-1800				45			13.6	0.8	1.5	14.5
75	27	03	EB1-2100				45			12.6	0.9	1.1	13.6
75	27	03	EB1-2400				47			10.5	0.9	1.3	11.5
75	28	03	EB1-0300				45			9.6	0.8	2.4	11.0
75	28	03	EB1-0600				42			9.2	0.7	2.5	10.7
75	07	04	EB1-C	79	12	12.4	52	8	17	9.0	0.6	4.9	11.7
75	07	04	MLB1-GAM			83.1							
75	08	04	EB1-C	107	24	23.0	73	18	28	20.7	0.9	4.1	20.7
75	08	04	MLB1-GAM			66.0							
75	09	04	EB1-C	64	10	12.9	46	7	18	10.5	0.9	2.9	11.3
75	09	04	MLB1-GAM			91.0							
75	10	04	EB1-C	50	9	17.2	45	7	20	10.9	0.2	3.6	13.9
75	10	04	MLB1-GAM			48.0							
75	11	04	MLB1-GAM			64.0							
75	07	04	EB1-0900				150			7.8	0.0	1.1	11.3
75	07	04	EB1-1200				48			5.8	1.2	6.0	10.2
75	07	04	EB1-1500				47			11.2	0.5	4.5	12.6
75	07	04	EB1-1800				52			11.5	0.8	3.5	12.6
75	07	04	EB1-2100				57			10.4	1.0	3.6	13.3
75	07	04	EB1-2400				56			9.8	0.9	3.6	11.8
75	08	04	EB1-0300				50			8.7	0.7	3.4	11.2
75	08	04	EB1-0600				46			8.2	0.5	3.6	9.7
75	08	04	EB1-0900				35			4.8	0.6	5.7	10.5
75	08	04	EB1-1200				49			33.3	0.9	1.7	33.3
75	08	04	EB1-1500				35			18.9	1.0	2.7	20.2
75	08	04	EB1-1800				67			15.7	0.5	0.7	16.4
75	08	04	EB1-2100				114			13.9	0.7	1.0	14.1
75	08	04	EB1-2400				38			13.6	0.8	2.0	13.7
75	09	04	EB1-0300				21			13.2	0.8	2.0	19.4
75	09	04	EB1-0600				47			10.3	0.7	2.7	17.4
75	09	04	EB1-0900				38			7.5	0.5	3.6	7.6
75	09	04	EB1-1200				22			7.0	0.5	4.4	7.3
75	09	04	EB1-1500				42			9.1	0.5	6.8	9.1
75	09	04	EB1-1800				34			14.0	1.1	4.0	14.0
75	09	04	EB1-2100				46			14.0	1.3	3.4	14.5

ANALYSES

YEAR	DAY	MON	SAMPLE DESIGNATION	UNFILTERED COD	UNFILTERED BOD	UNFILTERED TKN	FILTERED COD	FILTERED BOD	FILTERED FOC	FILTERED NH3N	FILTERED NO2N	FILTERED NO3N	FILTERED TKN
75	09	04	EB1-2400				44			14.0	1.2	2.3	15.2
75	10	04	EB1-0300				24			12.4	0.9	1.6	14.5
75	10	04	EB1-0600				24			10.3	0.6	2.2	12.2
75	10	04	EB1-0900				41			6.7	0.7	3.7	9.2
75	10	04	EB1-1200				42			7.1	0.6	4.0	9.6
75	10	04	EB1-1500				44			11.2	0.9	3.4	16.3
75	10	04	EB1-1800				60			13.0	1.2	2.2	18.9
75	10	04	EB1-2100				62			13.3	1.2	1.9	19.9
75	10	04	EB1-2400				63			14.0	1.1	1.7	20.6
75	11	04	EB1-0300				51			12.3	0.8	1.5	19.4
75	11	04	EB1-0600				50			11.0	0.5	2.1	13.8
75	15	04	EB1-C	134	26	5.4	83	27	32	12.9	0.5	0.4	13.9
75	15	04	MLB1-GAM			58.5							
75	16	04	EB1-C		33	27.7	112	23	32	22.0	0.5	1.1	28.0
75	16	04	MLB1-GAM			63.1							
75	17	04	EB1-C	128	30	17.7	67	26	27	12.0	0.7	0.4	15.8
75	17	04	MLB1-GAM			55.0							
75	18	04	EB1-C				48	7	16	12.3	0.8	1.2	15.2
75	18	04	MLB1-GAM			48.0							
75	19	04	EB1-C	190	24	10.0	47	18	20	6.3	0.8	2.1	8.2
75	19	04	MLB1-GAM			56.0							
75	20	04	NO MLSS TKN DUE TO OPERATOR ERROR.										
75	20	04	EB1-C	106	23	6.8	45	8	15	3.1	0.3	0.7	4.1
75	21	04	EB1-C	75	12	25.1	46	5	12	19.0	0.7	3.9	23.6
75	21	04	MLB1-GAM			89.0							
75	22	04	EB1-C	80	13	26.6	45	8	13	20.0	0.6	3.7	23.7
75	22	04	MLB1-GAM			53.0							
75	23	04	EB1-C	110	23	19.1	41	9	16	12.0	0.6	3.8	19.9
75	23	04	MLB1-GAM			96.0							
75	24	04	EB1-C	230	40	19.1	52	14	23	11.0	0.4	2.1	13.4
75	24	04	MLB1-GAM			56.0							
75	25	04	MLB1-GAM			62.0							
75	15	04	EB1-1100				63		29	9.6	0.4	2.3	10.4
75	15	04	EB1-1300				35		17	11.9	0.6	2.2	12.7
75	15	04	EB1-1500				42		17	13.2	0.7	0.9	14.3
75	15	04	EB1-1700				79		25	14.2	0.6	0.9	15.8
75	15	04	EB1-1900				74		21	15.1	0.5	1.1	16.9
75	15	04	EB1-2100				53		26	15.6	0.5	1.0	16.9
75	15	04	EB1-2300				59		35	15.9	0.5	1.0	17.4
75	16	04	EB1-0100				66		35	13.7	0.3	0.8	15.1
75	16	04	EB1-0300				33		50	12.0	0.0	0.2	12.9
75	16	04	EB1-0500				112		49	11.5	0.0	0.5	12.4
75	16	04	EB1-0700				104		45	9.5	0.5	0.2	10.7
75	16	04	EB1-0900				102		47	6.9	0.6	0.5	7.3
75	16	04	EB1-1100				51		31	8.8	0.1	0.7	9.6
75	16	04	EB1-1300				46		30	13.0	0.9	0.4	14.5
75	16	04	EB1-1500				80		22	12.0	0.7	0.7	13.7
75	16	04	EB1-1700				123		35	20.0	0.6	0.5	21.1

ANALYSES

YEAR	DAY	MON	SAMPLE DESIGNATION	UNFILTERED COD	UNFILTERED BOD	UNFILTERED TKN	FILTERED COD	FILTERED BOD	FILTERED FOC	FILTERED NH3N	FILTERED NO2N	FILTERED NO3N	FILTERED TKN
75	16	04	EB1-1900				150		42	18.0	0.4	0.4	20.3
75	16	04	EB1-2100				158		28	17.0	0.3	0.4	18.8
75	16	04	EB1-2300				126		50	19.0	0.3	0.3	21.0
75	17	04	EB1-0100				148		46	20.0	0.2	0.4	21.7
75	17	04	EB1-0300				144		38	23.0	0.2	0.3	25.0
75	17	04	EB1-0500				99		30	29.0	0.3	0.4	31.3
75	17	04	EB1-0700				51		24	27.0	0.3	0.6	30.0
75	17	04	EB1-0900				56		22	27.0	0.3	0.7	29.2
75	17	04	EB1-1100				54		14	28.0	1.4	1.1	30.8
75	17	04	EB1-1300				45		11	21.0	1.7	1.0	24.8
75	17	04	EB1-1500				42		13	12.7	1.3	0.5	16.0
75	17	04	EB1-1700				49		16	11.4	0.8	0.2	13.6
75	17	04	EB1-1900				39		13	9.2	0.7	0.2	10.9
75	17	04	EB1-2100				37		16	9.3	0.6	0.3	10.5
75	17	04	EB1-2300				63		27	10.2	0.5	0.2	12.4
75	18	04	EB1-0100				88		33	10.2	0.4	0.1	14.1
75	18	04	EB1-0300				91		43	10.3	0.5	0.1	15.2
75	18	04	EB1-0500				85		48	9.7	0.7	0.0	14.5
75	18	04	EB1-0700				83		54	6.0	0.2	0.0	12.8
75	18	04	EB1-0900				75		55	7.5	0.0	0.0	11.2
75	18	04	EB1-1100				47		19	10.6	0.9	1.1	13.8
75	18	04	EB1-1300				45		15	8.8	0.0	0.6	10.1
75	18	04	EB1-1500				42		12	9.7	0.3	1.0	10.8
75	18	04	EB1-1700				43		15	10.4	0.3	1.1	11.5
75	18	04	EB1-1900				45		15	9.9	0.3	1.0	11.0
75	18	04	EB1-2100				48		16	9.6	0.3	1.0	10.4
75	18	04	EB1-2300				51		18	10.2	0.3	1.4	10.7
75	19	04	EB1-0100				58		19	17.1	0.3	1.4	18.3
75	19	04	EB1-0300				63		20	22.0	0.3	1.1	24.9
75	19	04	EB1-0500				55		15	21.3	0.3	1.7	23.8
75	19	04	EB1-0700				46		12	19.7	0.3	2.6	21.1
75	19	04	EB1-0900				47		11	18.6	0.2	3.4	19.2
75	19	04	EB1-1100				35		11	17.0	2.7	4.0	18.7
75	19	04	EB1-1400				34		12	11.9	1.1	2.6	15.0
75	19	04	EB1-1700				36		15	7.2	0.8	1.2	8.7
75	19	04	EB1-2000				36		17	4.1	1.2	0.4	5.6
75	19	04	EB1-2300				38		23	2.6	0.5	0.6	4.2
75	20	04	EB1-0200				46		28	4.1	0.5	0.8	5.9
75	20	04	EB1-0500				50		31	5.7	0.5	1.1	8.4
75	20	04	EB1-0800				52		50	4.9	1.1	2.3	7.8
75	20	04	EB1-1100				37		12	2.7	0.0	0.8	3.2
75	20	04	EB1-1400				38		13	1.8	0.0	0.0	3.5
75	20	04	EB1-1700				33		15	3.4	0.0	0.0	4.1
75	20	04	EB1-2000				35		15	1.4	0.0	0.0	3.6
75	20	04	EB1-2300				35		17	0.5	0.2	0.2	1.6
75	21	04	EB1-0200				47		21	4.9	0.4	0.0	5.8
75	21	04	EB1-0500				44		16	7.0	0.6	0.3	7.8
75	21	04	EB1-0800				42		15	3.9	0.7	1.1	4.7

ANALYSES

YEAR	DAY	MON	SAMPLE DESIGNATION	UNFILTERED COD	UNFILTERED BOD	UNFILTERED TKN	FILTERED COD	FILTERED BOD	FILTERED FOC	FILTERED NH3N	FILTERED NO2N	FILTERED NO3N	FILTERED TKN
75	21	04	EB1-1100				40		12	5.0	0.9	5.7	6.8
75	21	04	EB1-1[illegible]00				41		15	11.4	0.5	3.1	13.9
75	21	04	EB1-1700				44		15	17.0	0.7	2.6	20.1
75	21	04	EB1-2000				43		13	19.0	0.7	2.2	21.9
75	21	04	EB1-2300				41		14	21.0	0.6	1.8	23.8
75	22	04	EB1-0200				45		12	22.0	0.6	1.9	25.1
75	22	04	EB1-0500				51		13	23.0	0.5	2.1	26.8
75	22	04	EB1-0800				50		13	23.0	0.5	2.7	26.8
75	22	04	EB1-1100				40		12	26.0	0.6	4.7	30.4
75	22	04	EB1-1400				38		9	27.0	0.5	2.8	29.8
75	22	04	EB1-1700				41		11	23.0	0.6	1.7	25.5
75	22	04	EB1-2000				41		12	23.0	0.8	1.8	25.5
75	22	04	EB1-2300				42		15	24.0	0.5	1.4	28.1
75	23	04	EB1-0200				53		14	22.0	0.6	1.6	24.4
75	23	04	EB1-0500				54		15	13.6	0.5	2.0	15.8
75	23	04	EB1-0800				39		10	10.9	0.4	3.0	11.9
75	23	04	EB1-1100				43		10	22.0	0.4	4.5	23.4
75	23	04	EB1-1300				36		10	21.0	0.6	4.6	22.1
75	23	04	EB1-1500				37		9	16.0	0.7	3.3	18.1
75	23	04	EB1-1700				33		11	12.0	0.8	3.3	13.6
75	23	04	EB1-1900				34		12	9.6	1.4	2.5	10.5
75	23	04	EB1-2100				41		16	8.0	0.8	1.3	9.7
75	23	04	EB1-2300				51		26	6.0	0.8	1.7	8.3
75	24	04	EB1-0100				50		24	8.9	0.7	1.6	10.1
75	24	04	EB1-0300				55		19	11.9	0.5	1.6	13.0
75	24	04	EB1-0500				56		60	12.7	0.4	2.0	13.3
75	24	04	EB1-0700				54		16	11.8	0.3	2.3	12.3
75	24	04	EB1-0900				49		15	9.5	0.3	2.7	11.1
75	24	04	EB1-1100				41		13	10.7	0.4	3.5	13.2
75	24	04	EB1-1300				41		17	12.7	0.4	2.6	15.9
75	24	04	EB1-1500				39		15	12.9	0.4	1.9	15.7
75	24	04	EB1-1700				41		15	12.6	0.4	1.5	15.2
75	24	04	EB1-1900				38		17	11.4	0.4	1.3	13.5
75	24	04	EB1-2100				39		18	10.5	0.4	1.2	12.3
75	24	04	EB1-2300				35		16	9.8	0.4	1.1	11.4
75	25	04	EB1-0100				44		22	10.6	0.4	0.8	12.6
75	25	04	EB1-0300				64		41	12.0	0.5	0.5	13.6
75	25	04	EB1-0500				59		35	12.3	0.5	0.7	13.9
75	25	04	EB1-0700				51		30	11.1	0.9	0.8	12.5
75	25	04	EB1-0900				51		29	7.8	0.6	2.0	9.2
75			FOLLOWING ARE THE 2 HR RESULTS FROM 19/4 1100HRS TO 23/4 1100 HRS AS										
75			INTERPRETED FROM A CONTINUOUS RECORD DURING THIS PERIOD BASED ON 3 HR										
75			SAMPLES										
75	19	04	EB1-1100				35		11	17.0	2.7	4.0	18.7
75	19	04	EB1-1300				35		11	13.5	1.5	3.0	16.0
75	19	04	EB1-1500				35		13	10.0	1.0	2.2	11.5
75	19	04	EB1-1700				36		15	7.2	0.8	1.2	8.7
75	19	04	EB1-1900				36		16	5.0	1.1	0.6	6.0

ANALYSES

YEAR	DAY	MON	SAMPLE DESIGNATION	UNFILTERED COD	UNFILTERED BOD	UNFILTERED TKN	FILTERED COD	FILTERED BOD	FILTERED FOC	FILTERED NH3N	FILTERED NO2N	FILTERED NO3N	FILTERED TKN
75	19	04	EB1-2100				37		19	3.5	1.0	0.5	5.0
75	20	04	EB1-0100				43		27	3.5	0.6	0.7	5.3
75	20	04	EB1-0300				48		29	4.6	0.5	0.9	5.5
75	20	04	EB1-0500				50		31	5.7	0.5	1.1	8.4
75	20	04	EB1-0700				51		43	5.3	0.9	1.5	8.0
75	20	04	EB1-0900				47		35	3.5	0.5	1.8	6.0
75	20	04	EB1-1100				37		12	2.7	0.0	0.8	3.2
75	20	04	EB1-1300				37		12	2.0	0.0	0.6	3.3
75	20	04	EB1-1500				36		14	2.5	0.0	0.0	3.6
75	20	04	EB1-1700				33		15	3.4	0.0	0.0	4.1
75	20	04	EB1-1900				34		15	2.0	0.0	0.0	3.8
75	20	04	EB1-2100				35		16	1.0	0.1	0.2	3.0
75	20	04	EB1-2300				35		17	0.5	0.2	0.2	1.6
75	21	04	EB1-0100				43		19	4.0	0.0	0.1	4.6
75	21	04	EB1-0300				46		19	5.5	0.5	0.2	6.5
75	21	04	EB1-0500				44		16	7.0	0.6	0.3	7.8
75	21	04	EB1-0700				43		15	5.0	0.6	0.8	5.5
75	21	04	EB1-0900				41		14	4.2	0.8	3.0	5.2
75	21	04	EB1-1100				40		12	5.0	0.9	3.7	6.8
75	21	04	EB1-1300				41		14	9.0	0.6	3.5	11.5
75	21	04	EB1-1500				42		15	13.0	0.6	2.8	15.0
75	21	04	EB1-1700				44		15	17.0	0.7	2.6	20.1
75	21	04	EB1-1900				43		14	18.0	0.7	2.3	20.5
75	21	04	EB1-2100				42		13	20.0	0.7	2.0	22.5
75	21	04	EB1-2300				41		14	21.0	0.6	1.8	23.8
75	22	04	EB1-0100				44		13	22.0	0.6	1.9	24.0
75	22	04	EB1-0300				47		13	22.5	0.5	2.0	25.7
75	22	04	EB1-0500				51		13	23.0	0.6	2.1	26.8
75	22	04	EB1-0700				50		13	23.0	0.6	2.5	26.0
75	22	04	EB1-0900				47		12	24.5	20.5	3.8	18.0
75	22	04	EB1-1100				40		12	26.0	0.6	4.7	30.4
75	22	04	EB1-1300				39		10	26.5	0.5	3.5	30.0
75	22	04	EB1-1500				39		10	25.0	0.6	2.5	27.5
75	22	04	EB1-1700				41		11	23.0	0.6	1.7	25.5
75	22	04	EB1-1900				42		11	23.5	0.7	1.7	25.0
75	22	04	EB1-2100				41		14	23.5	0.6	1.6	26.0
75	22	04	EB1-2300				42		15	24.0	0.5	1.4	28.1
75	23	04	EB1-0100				50		14	23.0	0.5	1.6	25.0
75	23	04	EB1-0300				53		14	17.0	0.6	1.7	22.0
75	23	04	EB1-0500				54		15	13.6	0.5	2.0	15.8
75	23	04	EB1-0700				44		12	11.5	0.4	2.5	13.0
75	23	04	EB1-0900				40		10	14.0	0.4	4.0	15.0
75	23	04	EB1-1100				43		10	22.0	0.4	4.5	23.4
75			END OF INTERPRETED RECORD										
75	05	05	EB1-C	74	14	53.1	58		16	42.0	1.0	1.5	51.8
75	05	05	MLB1-GAM			76.0							
75	07	05	EB1-C	69	9	46.1	53	7	16	39.0	3.0	3.6	44.9
75	07	05	MLB1-GAM			111.0							

ANALYSES

YEAR	DAY	MON	SAMPLE DESIGNATION	UNFILTERED COD	UNFILTERED BOD	UNFILTERED TKN	FILTERED COD	FILTERED BOD	FILTERED FOC	FILTERED NH3N	FILTERED NO2N	FILTERED NO3N	FILTERED TKN
75	12	05	EB1-C	123	29	22.9	54	17	22	19.7	0.7	2.5	21.0
75	12	05	MLB1-GAM			75.5							
75	13	05	EB1-C	159	61	26.9	60	23	10	18.8	0.5	1.6	20.6
75	13	05	MLB1-GAM			49.4							
75	14	05	EB1-C	156	32	21.4	70	21	16	16.0	0.6	1.3	18.2
75	14	05	MLB1-GAM			55.5							
75	15	05	EB1-C	185	40	27.7	122	26	31	22.2	0.6	1.3	23.8
75	15	05	MLB1-GAM			85.2							
75	12	05	EB1-0900				46		22	11.1	0.9	2.9	14.2
75	12	05	EB1-1200				33		12	8.8	0.7	2.7	11.5
75	12	05	EB1-1500				37		12	13.3	0.7	2.4	16.8
75	12	05	EB1-1800				44		14	19.5	1.2	2.3	22.7
75	12	05	EB1-2100				66		25	21.2	0.9	1.5	24.5
75	12	05	EB1-2400				83		32	23.7	0.5	0.8	25.9
75	13	05	EB1-0300				67		28	19.9	0.4	0.5	22.3
75	13	05	EB1-0600				58		16	18.1	0.3	0.5	19.9
75	13	05	EB1-0900				51		12	15.8	0.6	1.7	17.8
75	13	05	EB1-1200				37		12	17.7	0.4	1.2	18.5
75	13	05	EB1-1500				50		13	21.6	0.4	0.9	23.0
75	13	05	EB1-1800				77		20	24.1	0.3	0.5	26.3
75	13	05	EB1-2100				121		28	20.5	0.4	0.7	22.5
75	13	05	EB1-2400				104		24	19.1	0.4	0.7	20.4
75	14	05	EB1-0300				58		15	15.9	0.4	0.8	16.6
75	14	05	EB1-0600				53		12	13.1	0.4	0.8	15.0
75	14	05	EB1-0900				40		9	10.1	0.6	1.5	13.3
75	14	05	EB1-1200				37		8	15.0	0.4	1.0	17.8
75	14	05	EB1-1500				50		12	20.0	0.4	1.1	21.3
75	14	05	EB1-1800				60		19	19.0	0.2	0.3	20.9
75	14	05	EB1-2100				81		27	17.0	0.3	0.6	20.0
75	14	05	EB1-2400				69		22	19.0	0.3	0.5	21.6
75	15	05	EB1-0300				56		14	15.0	0.4	0.4	17.7
75	15	05	EB1-0600				51		11	14.0	0.4	0.6	16.2
75	15	05	EB1-0900				46		13	10.9	0.9	2.0	12.4
75	15	05	EB1-1200				45		15	19.0	0.8	1.7	19.6
75	15	05	EB1-1500				69		31	27.8	0.5	0.5	29.2
75	15	05	EB1-1800				86		43	28.4	0.3	0.3	30.1
75	15	05	EB1-2100				86		44	24.0	0.1	0.1	25.6
75	15	05	EB1-2400				76		33	20.9	0.3	0.1	22.6
75	16	05	EB1-0300				65		24	18.1	0.2	0.4	19.2
75	16	05	EB1-0600				56		20	16.0	0.3	0.3	17.2
75	26	05	EB1-C	155	35	23.0	68	20	26	19.3	0.9	4.2	21.6
75	26	05	MLB1-GAM			39.7							
75	27	05	EB1-C	247	71	25.3	93	46	47	12.5	0.5	2.5	19.1
75	27	05	MLB1-GAM			36.6							
75	28	05	EB1-C	195	56	16.1	60	28	38	11.2	0.4	1.9	13.3
75	28	05	MLB1-GAM			56.6							
75	29	05	EB1-C	138	29	17.0	59	14	17	11.9	0.4	1.4	13.2
75	29	05	MLB1-GAM			61.7							

ANALYSES

YEAR	DAY	MON	SAMPLE DESIGNATION	UNFILTERED COD	UNFILTERED BOD	UNFILTERED TKN	FILTERED COD	FILTERED BOD	FILTERED FOC	FILTERED NH3N	FILTERED NO2N	FILTERED NO3N	FILTERED TKN
75	26	05	EB1-0900				105		53	19.3	1.0	4.0	21.0
75	26	05	EB1-1200				38		15	12.1	0.9	3.6	13.4
75	26	05	EB1-1500				42		17	18.8	0.9	3.0	20.3
75	26	05	EB1-1800				63		25	21.8	0.2	0.3	24.3
75	26	05	EB1-2100				74		33	22.0	0.1	0.5	23.7
75	26	05	EB1-2400				73		37	19.9	0.2	0.5	22.1
75	27	05	EB1-0300				69		26	17.5	0.3	0.8	18.6
75	27	05	EB1-0600				60		21	17.5	0.2	0.8	18.2
75	27	05	EB1-0900				47		18	13.0	0.7	2.9	14.2
75	27	05	EB1-1200				53		24	11.7	0.0	0.5	12.9
75	27	05	EB1-1500				63		32	13.3	0.0	0.0	16.6
75	27	05	EB1-1800				92		42	16.1	0.0	0.0	19.7
75	27	05	EB1-2100				152		62	13.6	0.0	0.0	20.3
75	27	05	EB1-2400				163		63	13.4	0.0	0.0	22.2
75	28	05	EB1-0300				138		64	11.7	0.0	0.0	19.1
75	28	05	EB1-0600				109		48	10.3	0.0	0.0	17.2
75	28	05	EB1-0900				61		35	7.2	0.2	1.4	9.1
75	28	05	EB1-1200				48		32	7.8	0.0	0.0	9.8
75	28	05	EB1-1500				48		30	11.9	0.0	0.0	12.8
75	28	05	EB1-1800				64		39	13.9	0.0	0.0	14.9
75	28	05	EB1-2100				70		47	13.0	0.0	0.0	15.2
75	28	05	EB1-2400				70		41	11.5	0.0	0.0	13.3
75	29	05	EB1-0300				61		41	10.1	0.0	0.0	12.1
75	29	05	EB1-0600				57		35	9.4	0.1	0.5	11.6
75	29	05	EB1-0900				53		18	7.4	0.2	1.2	8.6
75	29	05	EB1-1200				50		17	8.0	0.2	0.1	8.5
75	29	05	EB1-1500				51		18	12.1	0.1	0.3	13.4
75	29	05	EB1-1800				57		20	14.1	0.2	0.3	16.4
75	29	05	EB1-2100				64		25	13.8	0.2	0.3	15.4
75	29	05	EB1-2400				79		33	13.6	0.2	0.2	15.7
75	30	05	EB1-0300				91		26	11.8	0.2	0.3	13.4
75	30	05	EB1-0600				57		22	10.9	0.2	0.3	12.3
75	02	06	EB1-C	115	27	21.0	53	15	15	17.4	0.6	1.8	18.5
75	02	06	ML81-GAM			31.7							
75	03	06	EB1-C	151	30	39.4	93	19	27	34.0	0.7	3.3	36.2
75	03	06	ML81-GAM			37.3							
75	04	06	EB1-C	120	25	50.1	55	14	24	44.0	0.3	0.7	46.9
75	04	06	ML81-GAM			73.1							
75	05	06	EB1-C	129	25	41.0	48	16	20	36.0	0.2	0.6	38.4
75	05	06	ML81-GAM			66.5							
75	02	06	EB1-0900				58		39	15.0	0.5	1.8	16.9
75	02	06	EB1-1200				38		17	12.3	0.3	0.6	13.5
75	02	06	EB1-1500				39		20	18.1	0.3	0.6	19.4
75	02	06	EB1-1800				53		24	19.9	0.3	0.2	22.6
75	02	06	EB1-2100				65		30	19.0	0.6	0.1	20.9
75	02	06	EB1-2400				61		30	17.6	0.4	0.2	18.8
75	03	06	EB1-0300				50		25	16.1	0.2	0.2	17.2
75	03	06	EB1-0600				50		22	13.8	0.0	0.2	15.6

ANALYSES

YEAR	DAY	MON	SAMPLE DESIGNATION	UNFILTERED COD	UNFILTERED BOD	UNFILTERED TKN	FILTERED COD	FILTERED BOD	FILTERED FOC	FILTERED NH3N	FILTERED NO2N	FILTERED NO3N	FILTERED TKN
75	03	06	EB1-0900				46		14	12.5	0.6	2.5	14.2
75	03	06	EB1-1200				47		14	21.0	0.3	0.7	21.5
75	03	06	EB1-1500				48		15	33.5	0.4	0.8	35.6
75	03	06	EB1-1800				53		27	42.0	0.3	0.4	44.6
75	03	06	EB1-2100				69		21	44.0	0.3	0.5	46.2
75	03	06	EB1-2400				78		47	47.0	0.2	0.4	48.0
75	04	06	EB1-0300				70		35	44.5	0.2	0.5	45.2
75	04	06	EB1-0600				61		25	41.0	0.1	0.5	42.6
75	04	06	EB1-0900				51		19	36.0	0.3	0.4	37.6
75	04	06	EB1-1200				47		15	37.0	0.4	0.7	38.6
75	04	06	EB1-1500				44		19	41.0	0.4	0.8	42.0
75	04	06	EB1-1800				47		24	45.0	0.2	0.4	45.9
75	04	06	EB1-2100				55		36	44.0	0.3	0.4	45.3
75	04	06	EB1-2400				47		34	46.0	0.5	0.4	47.0
75	05	06	EB1-0300				44		25	41.0	0.2	0.4	43.5
75	05	06	EB1-0600				55		24	39.0	0.2	0.3	40.2
75	05	06	EB1-0900				28		17	33.0	0.3	0.3	36.0
75	05	06	EB1-1200				37		18	35.0	0.3	0.5	36.6
75	05	06	EB1-1500				36		17	36.0	0.4	0.3	37.9
75	05	06	EB1-1800				20		21	39.0	0.2	0.5	40.6
75	05	06	EB1-2100				45		33	39.0	0.2	0.6	41.1
75	05	06	EB1-2400				53		35	40.0	0.1	0.5	43.0
75	06	06	EB1-0300				47		29	36.0	0.2	0.4	38.5
75	06	06	EB1-0600				41		22	30.0	0.1	0.2	32.5
75	20	06	EB1-C	89	22	55.5	49	4	26	47.9	1.7	3.9	49.0
75	20	06	MLB1-GAM			93.9							
73	09	11	EB2-0900	703.0		14.7	33.8			12.6	0.5	4.9	12.6
73	09	11	EB2-1200				35.8			11.0	0.2	3.6	11.0
73	09	11	EB2-1500	73.0		15.6	33.7			14.0	0.2	3.0	14.0
73	09	11	MLB2-0900			342.0							
73	09	11	MLB2-1500			397.0							
73	10	11	EB2-1045				51.3			19.4	1.3	13.7	19.5
73	11	11	EB2-1100				35.5			18.0	0.1	1.2	18.0
73	14	11	EB2-C	108.0		17.5	41.7		10	16.4	0.1	1.2	16.4
73	14	11	MLB2-GAM			234.0							
73	15	11	EB2-C	140.0	16	10.4	33.3	4	12	9.4	1.0	10.0	9.4
73	15	11	MLB2-GAM			238.0							
73	19	11	MLB2-GAM			302.0							
73	19	11	NO EB2-C AVAILABLE FOR ANALYSIS DUE TO SAMPLER MALFUNCTION										
73	20	11	EB2-C	100.0		11.9	35.2		10	10.0	1.3	20.7	10.4
73	20	11	EB2-GAM	100.0	27	11.4	36.2	4	13	9.6	1.4	30.6	9.5
73	20	11	MLB2-GPM			258.0							
73	21	11	EB2-C	147.0		17.4	32.6		10	11.0	0.9	18.1	11.0
73	21	11	MLB2			263.0							
73	27	11	EB2-GPM				27.6		40	9.3	0.6	3.6	9.3
73	27	11	MLB2-GAM			229.0							
73	29	11	EB2-GAM				33.9		10	3.5	0.2	1.4	3.5
73	29	11	EB2-GPM				36.4		9	6.8	0.5	3.6	6.6

ANALYSES

YEAR	DAY	MON	SAMPLE DESIGNATION	UNFILTERED COD	UNFILTERED BOD	UNFILTERED TKN	FILTERED COD	FILTERED BOD	FILTERED FOC	FILTERED NH3N	FILTERED NO2N	FILTERED NO3N	FILTERED TKN
73	29	11	MLB2-GAM			319.0							
74	22	01	EB2-GAM				54.4		7	5.8	0.2	1.5	6.3
74	22	01	EB2-GPM				50.1		7	9.9	0.3	1.3	9.9
74	22	01	MLB2-GAM			404.0							
74	28	01	EB2-GAM	35.3		5.5	30.8			4.6	0.4	3.9	4.6
74	29	01	ML92-GAM			188.0							
74	29	01	EB2-C	54.6	3	9.6	33.2	7	9	8.5	0.5	2.1	8.5
74	31	01	MLB2-0900			188.0							
74	31	01	MLB2-1500			197.0							
74	31	01	MLB2-1800			167.0							
74	31	01	MLB2-2100			207.0							
74	31	01	EB2-C1	45.8	24	8.8	28.6	3	4	7.7	0.6	2.6	7.7
74	31	01	EB2-C2	45.8	9	8.9	29.2	3	5	8.1	0.6	3.2	8.1
74	31	01	EB2-C3	47.6	14	11.1	32.1	3	4	10.1	0.6	3.3	10.1
74	31	01	EB2-C4	61.8	3	12.7	38.3	3	6	11.7	0.7	2.8	11.7
74	31	01	EB2-C5	57.8	31	13.3	35.4	3	5	12.0	0.7	2.2	12.0
74	01	02	EB2-C6	56.5	23	14.2	36.0	21	5	13.2	0.6	2.1	13.2
74	01	02	EB2-C7	62.0	22	14.9	33.8	12	5	13.3	0.6	1.9	13.3
74	01	02	EB2-C8	53.8	22	12.0	32.8	4	5	10.9	0.5	2.1	10.9
74	31	01	EB2-C	52.4	7	11.3	30.9	12	5	10.2	0.7	1.8	10.2
74	04	02	EB2-C1	54.3	18	11.1	36.1	19	13	9.6	0.4	2.3	9.6
74	04	02	EB2-C2	47.7	17	9.9	29.1	5	5	8.9	0.4	3.0	8.9
74	04	02	EB2-C3	52.5	13	14.0	33.0	4	14	12.6	0.4	3.1	12.6
74	04	02	EB2-C4	54.8	9	16.5	32.9	4	6	15.2	0.3	2.2	15.2
74	04	02	EB2-C5	59.5	15	16.3	38.4	4	7	14.1	0.4	1.2	14.1
74	05	02	EB2-C6	64.1	13	16.4	42.3	4	8	14.6	0.3	0.6	14.6
74	05	02	EB2-C7	63.3	16	16.3	45.7	4	9	14.2	0.2	0.3	14.2
74	05	02	EB2-C8	65.0	14	15.4	45.1	4	8	13.0	0.3	0.2	13.0
74	04	02	EB2-C	74.0	11	14.3	39.0	4	7	11.8	0.4	1.0	11.8
74	04	02	MLB2-0900			127.0							
74	04	02	MLB2-1500			151.0							
74	05	02	MLB2-0900			169.0							
74	05	02	EB2-C1				39.0			8.9	0.7	2.2	8.9
74	05	02	EB2-C2				40.0			11.7	0.7	2.1	11.7
74	05	02	EB2-C3				47.0			12.9	0.6	1.6	12.9
74	05	02	EB2-C4				50.0			13.3	0.5	1.2	13.3
74	05	02	EB2-C5				52.0			13.5	0.5	1.0	13.5
74	06	02	EB2-C6				46.0			13.2	0.5	0.9	13.2
74	06	02	EB2-C7				47.0			11.8	0.5	1.2	11.8
74	06	02	EB2-C8				50.0			8.5	0.6	1.7	8.5
74	05	02	EB2-C				47.0			11.7	0.4	1.3	11.7
74	11	02	EB2-C	82.0	13	11.3	60.0	6	42	9.8	1.5	3.7	9.8
74	11	02	MLB2-GAM			188.0							
74	13	02	MLB2-GAM			178.0							
74	13	02	EB2-C	153	26	8.3	121	12	8	6.4	2.5	9.2	6.4
74	19	02	MLB2-GAM			196.0							
74	19	02	EB2-C	127	16	16.7	88	3	9	14.5	0.8	2.9	14.5
74	21	02	MLB2-GAM			171.0							

ANALYSES

YEAR	DAY	MON	SAMPLE DESIGNATION	UNFILTERED COD	UNFILTERED BOD	UNFILTERED TKN	FILTERED COD	FILTERED BOD	FILTERED FOC	FILTERED NH3N	FILTERED NO2N	FILTERED NO3N	FILTERED TKN
74	21	02	EB2-C	75	12	6.5	79	4	6	5.5	3.3	5.3	5.5
74	27	02	MLB2-GAM			64.0							
74	27	02	EB2-C	74	15	2.3	48	4	6	0.6	1.4	15.6	1.9
74	01	03	EB2-C	68	11	5.7	60	3	8	3.5	1.3	11.2	3.5
74	01	03	MLB2-GAM			157.0							
74	EB2-PM MAR 01 FILT										3.5	13.5	
74	04	03	EB2-C1				52			0.0	0.1	9.0	1.2
74	04	03	EB2-C2				67			2.4	0.8	11.0	3.1
74	04	03	EB2-C3				66			7.4	0.9	8.9	7.6
74	04	03	EB2-C4				84			8.7	0.8	6.2	8.8
74	05	03	EB2-C5				75			7.5	1.0	5.2	7.5
74	05	03	EB2-C6				64			2.7	0.9	5.1	3.1
74	04	03	EB2-C	117		2.8							
74	04	03	MLB2-0900			31.0							
74	04	03	EB2-0900	79		2.9	38			0.2	0.1	8.7	0.8
74	05	03	EB2-CC1				42			4.3	1.0	4.4	4.3
74	05	03	EB2-CC2				37			8.6	1.1	2.8	8.6
74	06	03	EB2-CC3				34			8.3	0.7	2.3	8.3
74	05	03	EB2-C	111		12.4							
74	06	03	EB2-CC1				34			7.2	0.5	2.6	7.2
74	06	03	EB2-CC2				48			11.1	0.3	1.8	11.1
74	07	03	EB2-CC3				39			10.3	0.3	1.8	10.3
74	06	03	EB2-C	146		13.1							
74	06	03	MLB2-GAM			26.0							
74	15	03	EB2-C	141	24	15.9	37.3	6	21	11.1	0.8	5.5	11.1
74	25	03	MLB2-GAM			105.0							
74	25	03	EB2-C	120	23	16.4	41	6	15	14.5	1.3	15.2	14.5
74	03	04	EB2-C	70	14	12.1	37	6	11	10.0	0.6	15.3	10.0
74	03	04	MLB2-GAM			58.0							
74	05	04	EB2-C	41	6	7.2	37	5	16	6.2	0.5	12.6	6.2
74	05	04	MLB2-GAM			105.0							
74	09	04	MLB2-0900			107.0							
74	09	04	MLB2-1500			64.0							
74	ALL COD ANALYSES ON 09 + 10/04/74 QUESTIONABLE DUE TO ANALYTICAL ERROR												
74	09	04	EB2-C1	12	19	2.9	4	14	14	0.3	0.1	11.6	1.0
74	09	04	EB2-C2	33	6	2.0	33	4	7	0.3	0.2	13.0	0.9
74	09	04	EB2-C3	33	6	2.2	29	4	7	0.9	1.9	18.0	1.2
74	09	04	EB2-C4	4	6	2.7	12	4	7	1.6	3.1	24.0	2.2
74	09	04	EB2-C5	45	6	4.4	41	5	13	3.5	3.4	25.0	3.9
74	10	04	EB2-C6	53	4	5.5	37	5	9	4.7	3.2	28.0	4.7
74	10	04	EB2-C7	41	8	4.2	24	3	8	4.2	3.0	28.0	4.2
74	10	04	EB2-C8	29	6	2.4	37	4	8	3.0	2.5	29.0	3.3
74	09	04	EB2-C	20	7	2.3	65	6	8	2.1	2.0	24.0	2.8
74	10	04	MLB2-0900			80.0							
74	10	04	MLB2-1500			64.0							
74	10	04	EB2-C1	54	4	4.1	20	3	8	1.0	1.3	24.7	1.7
74	10	04	EB2-C2	54	5	3.5	29	3	7	0.6	0.8	26.2	1.4
74	10	04	EB2-C3	54	5	2.5	29	4	7	1.0	1.8	27.2	1.3

ANALYSES

				UNFILTERED			FILTERED						
YEAR	DAY	MON	SAMPLE DESIGNATION	COD	BOD	TKN	COD	BOD	FOC	NH3N	NO2N	NO3N	TKN
74	10	04	EB2-C4	58	6	2.8	41	3	8	1.2	1.9	30.1	2.0
74	10	04	EB2-C5	58	7	2.2	37	3	10	0.8	1.3	30.7	1.9
74	11	04	EB2-C6	58	6	2.5	41	2	10	0.7	1.2	27.8	2.1
74	11	04	EB2-C7	54	5	2.6	37	2	10	1.3	1.2	27.8	2.1
74	11	04	EB2-C8	50	5	2.6	37	3	13	1.3	1.0	29.0	1.6
74	10	04	EB2-C	50	4	3.6	37	3	8	1.2	1.4	27.6	3.6
74	16	04	MLB2-GAM			163.0							
74	16	04	EB2-C	76	13	2.8	36	6	10	0.4	0.3	9.8	1.3
74	18	04	MLB2-GAM			191.0							
74	18	04	EB2-C	44	7	7.4	24	7	9	6.6	0.4	11.7	6.6
74	23	04	MLB2-GAM			149.0							
74	23	04	EB2-C	44	6	22.8	36	4	9	1.1	1.0	14.3	2.4
74	25	04	MLB2-GAM			164.0							
74	25	04	EB2-C	40	7	4.8	36	5	9	3.1	3.1	14.8	4.6
74	30	04	MLB2-1500			142.0							
74	30	04	MLB2-0900			151.0							
74	30	04	EB2-C1	47	5	1.8	51	3	9	0.4	0.2	13.8	1.7
74	30	04	EB2-C2	51	4	1.9	31	2	7	0.3	0.3	17.7	1.3
74	30	04	EB2-C3	51	5	2.4	39	2	7	0.8	2.2	26.3	1.9
74	30	04	EB2-C4	51	5	3.5	43	3	8	1.0	2.4	27.1	2.8
74	30	04	EB2-C5	55	5	4.7	43	2	9	1.4	1.8	35.2	4.0
74	01	05	EB2-C6	70	6	5.8	35	3	10	1.4	1.6	35.4	5.0
74	01	05	EB2-C7	59	6	5.7	39	3	9	1.0	1.3	32.2	4.8
74	01	05	EB2-C8	63	5	5.4	39	2	10	1.3	1.1	31.9	4.7
74	30	04	EB2-C	55	5	4.4	43	3	9	0.9	1.4	28.1	3.4
74	01	05	MLB2-0900			131.0							
74	01	05	MLB2-1500			117.0							
74	01	05	EB2-C9	47	13	4.5	19	3	9	4.0	0.5	36.0	4.5
74	01	05	EB2-C10	36	13	5.8	25	3	9	5.7	0.5	37.0	5.7
74	01	05	EB2-C11	47	19	12.5	25	3	8	11.2	1.0	36.5	11.2
74	01	05	EB2-C12	40	23	15.6	34	3	9	15.6	1.0	38.0	15.6
74	01	05	EB2-C13	51	19	16.9	34	3	10	17.0	1.0	36.5	17.0
74	02	05	EB2-C14	55	20	15.8	34	4	11	15.2	1.0	36.5	15.2
74	02	05	EB2-C15	63	38	21.4	34	3	9	19.7	1.0	29.0	19.7
74	02	05	EB2-C16	59	46	22.8	38	4	9	20.9	4.0	27.5	20.9
74	01	05	EB2-C	51	21	14.8	25	4	9	14.5	1.5	36.0	14.5
74	14	05	MLB2-GAM			94.0							
74	14	05	EB2-C	36	20	14.7	16	4	6	12.4	0.5	15.0	12.4
74	16	05	MLB2-GAM			141.0							
74	16	05	EB2-C	46	8	8.5	25	3	7	7.2	0.5	24.0	7.2
74	21	05	EB2-C	46	11	9.4	13	3	10	7.7	0.9	10.6	7.7
74	21	05	MLB2-GAM			124.0							
74	23	05	EB2-C	60	9	11.1	34	4	11	9.0	0.3	9.8	9.0
74	23	05	MLB2-GAM			187.0							
74	04	06	MLB2-GAM			274.0							
74	04	06	EB2-C	48	5	12.5	37	4	10	13.3	0.4	6.4	13.3
74	06	06	EB2-C	46	4	12.0	36	10	11	10.7	1.1	11.4	10.7
74	06	06	MLB2-GAM			260.0							

ANALYSES

YEAR	DAY	MON	SAMPLE DESIGNATION	UNFILTERED COD	UNFILTERED BOD	UNFILTERED TKN	FILTERED COD	FILTERED BOD	FILTERED FOC	FILTERED NH3N	FILTERED NO2N	FILTERED NO3N	FILTERED TKN
74	13	06	MLB2-GAM			275.0							
74	13	06	EB2-C	82	4	9.8	51	3	10	9.8	2.1	18.4	9.8
74	18	06	EB2-C	38	4	3.4	23	3	9	2.3	1.5	14.0	2.3
74	18	06	MLB2-GAM			166.0							
74	20	06	EB2-C	42	5	2.4	31	4	10	1.8	0.5	16.5	1.8
74	26	06	MLB2-GAM			94.0							
74	26	06	EB2-C	42	7	5.0	25	5	8	4.3	1.5	18.5	4.3
74	28	06	MLB2-GAM			90.0							
74	28	06	EB2-C	62	8	4.7	42	4	12	3.3	3.0	25.5	3.3
74	02	07	MLB2-GAM			74.0							
74	02	07	EB2-C	46	4	2.9	33	4	10	2.6	2.0	27.5	2.6
74	05	07	MLB2-GAM			89.0							
74	05	07	EB2-C	42	6	4.5	30	5	10	4.0	0.5	22.5	4.0
74	10	07	EB2-C	70	6	5.8	37	5	12	4.3	0.1	8.7	4.3
74	10	07	MLB2-GAM			207.0							
74	12	07	EB2-C	62	6	5.2	38	5	13	4.4	0.1	8.4	4.4
74	12	07	MLB2-GAM			250.0							
74	16	07	EB2-C	38	7	5.2	39	4	10	3.9	0.4	22.8	4.6
74	16	07	MLB2-GAM			229.0							
74	18	07	EB2-C	65	8	5.2	47	4	11	3.4	0.2	21.3	4.4
74	18	07	MLB2-GAM			194.0							
74	22	07	EB2-C	51	10	7.7	34	5	13	5.5	0.1	13.5	6.6
74	22	07	MLB2-GAM			142.0							
74	30	07	EB2-C	67	11	12.1	29	6	10	8.5	0.5	24.5	9.6
74	30	07	MLB2-GAM			165.0							
74	06	08	EB2-C	44	9	4.2	16	7	13	2.8	1.2	24.8	3.4
74	06	08	MLB2-GAM			140.0							
74	09	08	EB2-0850	108	8	4.5	28	6	10	0.5	0.1	31.4	1.4
74	08	08	EB2 SAMPLER MALFUNCTION GRABBED SAMPLES AT 0800 NEXT MORNING										
74	08	08	MLB2-GAM			155.0							
74	13	08	EB2-C	44	5	6.7	16	6	10	4.9	0.2	28.3	5.6
74	13	08	EB2(0900-1700)				16			6.4	0.1	29.0	7.3
74	13	08	MLB2-GAM			136.0							
74	15	08	EB2-C	61	9	8.9	37	6	11	6.6	0.3	30.7	7.4
74	15	08	MLB2-GAM			78.0							
74	20	08	EB2-C	49	11	4.6	25	12	10	2.9	0.2	15.3	3.5
74	20	08	MLB2-GAM			123.0							
74	22	08	EB2-C	61	12	8.2	20	6	13	6.5	0.2	20.3	7.2
74	22	08	MLB2-GAM			187.0							
74	29	08	EB2-C	50	6	15.2	29	5	15	10.0	0.2	4.9	14.2
74	29/08/74		RATE DAY PLANT 8 (TSS) SYSTEM ANALYSIS BASED ON 21 HR COMPOSITE										
74	29	08	HEAVY SOLIDS 0100 TO 0400 HRS IN EB2 SAMPLER, THESE HRS MISSING FROM										
74			24 HR. COMPOSITE EB2.										
74	29	08	MLB2-GAM			269.0							
74	06	09	EB2-C	42	6	10.0	29	4	11	8.0	0.2	38.8	8.1
74	06	09	MLB2-GAM			171.0							
74	10	09	EB2-C	41	6	7.5	21	3	12	6.7	0.1	36.0	7.1
74	10	09	MLB2-GAM			153.0							

ANALYSES

YEAR	DAY	MON	SAMPLE DESIGNATION	UNFILTERED COD	UNFILTERED BOD	UNFILTERED TKN	FILTERED COD	FILTERED BOD	FILTERED FOC	FILTERED NH3N	FILTERED NO2N	FILTERED NO3N	FILTERED TKN
74	12	09	EB2-09-2300	49	4	17.0	32	3	11	12.5	0.1	21.0	15.9
74	12	09	EB2 SAMPLER BRAKEDOWN,ONLY TOOK SAMPLES FROM 0900 TO 2300 HRS										
74	12	09	MLB2-GAM			209.0							
74	17	09	EB2-C	42	2	21.0	31	2	12	19.0	0.3	19.7	19.8
74	17	09	MLB2-GAM			259.0							
74	19	09	EB2-C	42	4	16.0	37	3	13	14.8	0.1	15.4	14.8
74	19	09	MLB2-GAM			217.0							
74	25	09	EB2-C	51	5	6.5	33	3	15	4.6	0.0	32.5	4.8
74	25	09	MLB2-GPM			160.0							
74	27	09	EB2-C	72	9	10.6	38	3	17	6.5	0.0	32.5	7.5
74	27	09	MLB2-GPM			145.0							
74	03	10	EB2-C	54	7	8.2	35	6	16	5.1	0.0	10.8	6.3
74	03	10	MLB2-GPM			282.0							
74	08	10	EB2-C	43	5	5.3	32	4	17	3.2	0.1	13.9	4.7
74	08	10	MLB2-GAM			309.0							
74	10	10	EB2-C	50	7	7.3	31	5	19	3.4	0.4	12.7	5.4
74	10	10	MLB2-GAM			288.0							
74	18	10	EB2-C	67	6	17.3	46	3	17	15.0	1.5	27.0	15.8
74	18	10	MLB2-GAM			177.0							
74	25	10	EB2-C SAMPLER MISSED LAST FOUR SAMPLES DUE TO MECHANICAL BREAKDOWN										
74	25	10	EB2-C	47	4	5.2	37	3	17	3.2	0.5	41.5	4.4
74	25	10	MLB2-GAM			339.0							
74	28	10	EB2-C	42	6	4.9	34	3	17	2.8	7.3	38.7	4.2
74	28	10	MLB2-GAM			252.0							
74	04	11	EB2-C	38	7	9.3	25	4	17	7.7	3.7	36.3	9.3
74	04	11	MLB2-GAM			63.0							
74	06	11	EB2-C	58	10	3.6	29	3	13	2.2	0.2	39.3	3.1
74	06	11	MLB2-GAM			39.0							
74	13	11	EB2-C	58	10	17.1	45	4	13	14.0	9.9	39.1	15.2
74	13	11	MLB2-GAM			88.0							
74	15	11	EB2-C	66	6	15.1	33	4	13	14.0	0.3	26.7	14.1
74	15	11	MLB2-GAM			86.0							
74	25	11	EB2-C	46	7	6.9	25	3	9	5.6	0.2	26.0	5.6
74	25	11	MLB2-GAM			122.0							
74	27	11	EB2-C	29	41	12.6	25	3	9	11.0	0.0	28.0	12.1
74	27	11	MLB2-GAM			211.0							
74	09	12	EB2-0900	79		2.7			17	0.2	0.0	10.0	1.8
74	09	12	EB2-1100	37		1.7			16	0.1	0.0	11.2	0.8
74	09	12	EB2-1300	46		6.4			10	0.1	0.0	11.4	0.9
74	09	12	EB2-1500	54		8.7			10	1.4	0.0	11.9	7.1
74	09	12	EB2-1700	50		10.2			12	2.6	0.0	12.3	9.5
74	09	12	EB2-1900	62		17.4			10	6.0	0.0	10.2	15.0
74	09	12	EB2-2100	83		20.3			10	9.8	0.0	8.9	19.5
74	09	12	EB2-2300	100		26.8			14	12.3	0.0	7.1	23.9
74	10	12	EB2-0100	129		34.8			17	16.3	0.0	5.4	30.9
74	10	12	EB2-0300	149		38.3			24	18.0	0.0	4.0	19.4
74	10	12	EB2-0500	158		24.8			27	21.4	0.0	3.0	21.9
74	10	12	EB2-0600	158		23.6			27	18.6	0.0	2.3	19.4

ANALYSES

			SAMPLE	UNFILTERED			FILTERED						
YEAR	DAY	MON	DESIGNATION	COD	BOD	TKN	COD	BOD	FOC	NH3N	NO2N	NO3N	TKN
74	10	12	EB2-0900	112		19.9			20	16.9	0.1	3.2	17.1
74	10	12	EB2-1100	79		17.1			17	12.8	0.2	3.4	14.7
74	10	12	EB2-1300	75		15.3			15	11.9	0.1	4.3	13.6
74	10	12	EB2-1500	75		15.5			13	12.1	0.0	4.7	13.9
74	10	12	EB2-1700	79		16.5			12	13.2	0.0	5.3	14.7
74	10	12	EB2-1800	91		17.6			13	14.5	0.0	5.3	15.1
74	10	12	EB2-2200	91		19.6			15	16.2	0.0	4.2	17.4
74	10	12	EB2-2300	104		20.3			19	17.9	0.0	4.0	18.8
74	11	12	EB2-0100	124		21.7			15	17.9	0.0	3.6	18.6
74	11	12	EB2-0300	100		20.8			17	19.0	0.1	3.1	19.3
74	11	12	EB2-0500	137		22.6			17	19.1	0.0	2.6	19.7
74	11	12	EB2-0700	112		22.5			19	19.0	0.0	2.3	19.8
74	11	12	EB2-0900	89		22.9			42	17.9	0.0	2.5	18.6
74	11	12	EB2-1100	80		22.2			21	17.8	0.0	3.1	18.4
74	11	12	EB2-1300	84		17.5			16	17.0	0.0	3.6	17.6
74	11	12	EB2-1500	76		20.3			14	17.2	0.0	4.4	18.6
74	11	12	EB2-1600	64		22.0			17	18.9	0.0	4.6	20.6
74	11	12	EB2-1800	44		22.7			28	18.9	0.0	4.9	22.7
74	11	12	EB2-1900	101		19.9			19	14.1	0.0	5.9	15.2
74	11	12	EB2-2000						19	14.1	0.0	6.0	15.0
74	11	12	EB2-2200	106		18.3			19	16.3	0.1	5.8	17.2
74	11	12	EB2-2300	118		21.3			19	12.9	0.0	5.5	15.8
74	12	12	EB2-0100	113		19.9			19	16.3	0.1	4.7	17.8
74	12	12	EB2-0300	101		21.6			19	16.7	0.1	3.9	17.9
74	12	12	EB2-0500	92		20.0			19	18.0	0.1	3.9	19.0
74	12	12	EB2-0700	94		20.6			17	17.4	0.1	3.8	18.3
74	12	12	EB2-0900	55		17.8			19	15.6	0.0	2.5	17.2
74	12	12	EB2-1200	50		14.9			19	13.4	0.1	3.1	13.9
74	12	12	EB2-1600	73		16.7			21	14.1	0.1	3.8	15.4
74	13	12	EB2-0800	66		16.1			21	13.9	0.0	3.2	15.0
74	13	12	EB2-0900	64		15.5			21	12.0	0.3	4.2	14.8
74	13	12	EB2-1300	76		15.0			19	10.8	0.3	4.0	13.7
74	13	12	EB2-1700	72		16.5			14	13.5	0.1	4.1	14.9
74	13	12	EB2-2100	69		18.3			23	15.1	0.0	3.7	16.6
74	14	12	EB2-0100	76		19.7			21	16.0	0.0	3.4	17.3
74	14	12	EB2-0500	61		18.0			17	16.0	0.0	2.9	17.2
74	14	12	EB2-0800	56		17.9			19	15.1	0.0	3.1	16.7
74	17	12	EB2-0900	42		10.0	32			6.7	2.1	19.0	9.0
74	17	12	EB2-1200	50		11.4	29			10.0	0.1	8.1	10.9
74	17	12	EB2-1300	47		14.0	30			12.7	0.0	6.6	12.8
74	17	12	EB2-1400	49		15.8	37			14.4	0.0	6.0	14.6
74	17	12	EB2-1500	61		17.6	41			15.1	0.0	4.8	16.1
74	17	12	EB2-1600	67		19.5	45			16.0	0.0	4.7	17.3
74	17	12	EB2-1700	64		20.7	42			17.0	0.0	4.5	18.1
74	17	12	EB2-1800	90		21.0	45			16.3	0.0	4.6	17.8
74	17	12	EB2-1900	73		20.1	38			16.3	0.0	5.1	17.7
74	17	12	EB2-2000	62		19.2	39			16.1	0.0	5.6	17.3
74	17	12	EB2-2100	66		18.4	40			15.0	0.0	5.5	16.0

ANALYSES

			SAMPLE	UNFILTERED			FILTERED						
YEAR	DAY	MON	DESIGNATION	COD	BOD	TKN	COD	BOD	FOC	NH3N	NO2N	NO3N	TKN
74	17	12	EB2-2200	67		18.3	45			16.0	0.0	7.1	17.0
74	17	12	EB2-2300	64		16.1	42			13.1	0.0	6.8	14.8
74	17	12	EB2-2400	64		16.1	42			13.0	0.0	7.2	14.4
74	18	12	EB2-0100	64		14.9	36			12.8	0.0	7.5	14.1
74	18	12	EB2-0200	62		19.5	41			10.8	0.0	12.5	17.3
74	18	12	EB2-0300	12		20.7	41			11.2	2.4	9.8	18.1
74	18	12	EB2-0400	64		21.0	42			12.7	0.0	7.8	14.0
74	18	12	EB2-0500	61		14.1	40			12.4	0.0	8.6	13.2
74	18	12	EB2-0600	52		13.2	41			11.4	0.0	8.7	13.0
74	18	12	EB2-0700	67		12.9	40			11.3	0.0	8.9	11.3
74	18	12	EB2-0800	58		12.6	37			10.6	0.0	9.1	11.2
74	18	12	EB2-1000	61		9.5	42			8.3	0.0	10.2	8.5
74	18	12	EB2-1200	60		9.0	37			7.5	0.0	10.9	8.0
74	18	12	EB2-1400	63		9.2	51			7.3	0.0	10.7	8.0
74	18	12	EB2-1600	68		10.4	52			9.1	0.0	10.9	9.2
74	18	12	EB2-1800	59		10.3	43			8.2	0.9	13.1	8.9
74	18	12	EB2-2000	48		11.4	38			9.8	0.0	11.8	10.1
74	18	12	EB2-2200	64		11.4	42			10.4	0.0	10.4	10.8
74	18	12	EB2-2400	55		11.6	42			10.1	0.0	11.3	10.9
74	19	12	EB2-0200	56		11.6	36			9.9	0.0	11.2	10.4
74	19	12	EB2-0400	56		11.3	39			10.1	0.0	11.5	11.3
74	19	12	EB2-0600	57		11.7	38			9.7	0.0	11.2	10.4
74	19	12	EB2-0800	59		11.1	39			9.5	0.0	11.3	10.4
74	19	12	EB2-0900	68		10.5	40			7.7	0.0	8.9	8.5
74	19	12	EB2-1200	55		7.1	40			5.8	0.0	10.6	6.4
74	19	12	EB2-1500	56		7.4	39			5.7	0.0	10.5	6.6
74	19	12	EB2-1800	61		9.0	36			7.2	0.0	12.2	8.3
74	19	12	EB2-2100	67		14.2	44			12.2	0.0	12.1	13.0
74	19	12	EB2-2400	67		14.5	44			11.5	0.0	11.9	12.3
74	20	12	EB2-0300	71		12.1	43			10.5	0.0	12.0	10.9
74	20	12	EB2-0600	71		10.7	42			8.1	0.0	12.3	9.1
74	20	12	EB2-0900	80		6.2	45			4.9	0.0	13.0	6.7
74	20	12	EB2-1200	73		4.6	48			1.6	0.1	13.1	3.5
74	20	12	EB2-1500	75		5.3	50			1.6	0.0	13.0	4.0
74	20	12	EB2-1800	83		6.2	46			2.5	0.0	16.0	4.7
74	20	12	EB2-2100	82		7.4	43			3.3	0.0	18.0	5.5
74	20	12	EB2-2400	67		6.3	52			4.2	0.0	18.0	6.3
74	21	12	EB2-0300	71		6.1	44			3.5	0.0	18.0	4.8
74	21	12	EB2-0600	71		5.5	40			3.0	0.0	17.8	4.2
75	28	01	EB2-0900	142		4.7	119		27	0.6	0.1	11.9	2.4
75	28	01	EB2-1000	77		2.8	100		15	0.6	0.1	12.9	1.5
75	28	01	EB2-1100	98		3.9	129		15	0.5	0.1	11.9	1.4
75	28	01	EB2-1200	93		4.0	88		18	0.5	0.1	11.9	1.7
75	28	01	EB2-1300	78		2.8	38		11	0.4	0.0	13.0	1.7
75	28	01	EB2-1400	78		3.4	40		12	0.5	0.2	13.8	1.8
75	28	01	EB2-1500	67		4.0	42		12	1.4	0.7	9.3	3.2
75	28	01	EB2-1600	68		3.8	43		13	1.3	0.7	14.3	3.1
75	28	01	EB2-1700	80		5.2	48		12	2.3	0.7	13.3	4.3

ANALYSES

YEAR	DAY	MON	SAMPLE DESIGNATION	UNFILTERED COD	UNFILTERED BOD	UNFILTERED TKN	FILTERED COD	FILTERED BOD	FILTERED FOC	FILTERED NH3N	FILTERED NO2N	FILTERED NO3N	FILTERED TKN
75	28	01	EB2-1800	91		5.7	40		19	3.4	0.7	14.3	4.4
75	28	01	EB2-1900	78		7.4	47		13	4.4	0.7	13.3	5.7
75	28	01	EB2-2000	78		8.5	45		16	5.4	0.5	13.6	6.1
75	28	01	EB2-2100	69		8.5	44		15	7.3	0.6	13.9	8.2
75	28	01	EB2-2200	75		7.1	44		21	5.5	0.7	16.3	7.0
75	28	01	EB2-2300	74		8.2	44		15	4.8	0.9	13.1	6.0
75	28	01	EB2-2400	43		6.8	73		13	4.1	0.4	13.6	4.9
75	29	01	EB2-0100	70		5.7	44		13	3.0	0.9	13.1	4.0
75	29	01	EB2-0200	75		4.4	45		13	2.2	0.8	14.2	3.4
75	29	01	EB2-0300	66		3.2	41		13	1.4	0.3	13.7	2.5
75	29	01	EB2-0400	64		2.8	40		12	1.0	0.3	12.7	2.1
75	29	01	EB2-0500	66		2.6	38		12	0.6	0.1	13.9	1.7
75	29	01	EB2-0600	71		3.3	45		12	0.7	0.0	15.0	2.0
75	29	01	EB2-0700	74		2.8	44		18	0.4	0.0	14.0	1.0
75	29	01	EB2-0800	60		2.1	38		20	0.4	0.0	15.0	0.9
75	29	01	EB2-0900	71		1.8	41		14	0.4	0.0	15.0	0.9
75	29	01	EB2-1000	67		2.5	44		14	0.4	0.0	12.0	1.7
75	29	01	EB2-1100	76		3.2	41		15	0.5	0.0	14.0	1.8
75	29	01	EB2-1200	75		3.1	46		13	0.5	0.0	13.0	1.7
75	29	01	EB2-1300	77		2.5	41		18	0.3	0.0	14.1	1.5
75	29	01	EB2-1400	68		2.3	41		13	0.4	0.1	14.1	1.4
75	29	01	EB2-1500	71		2.5	43		15	0.6	0.1	13.9	1.5
75	29	01	EB2-1600	64		2.3	40		14	0.7	0.2	13.6	1.6
75	29	01	EB2-1700	60		3.6	28		15	0.4	0.1	12.1	1.9
75	29	01	EB2-1800	71		4.0	33		17	0.3	0.0	11.8	1.9
75	29	01	EB2-1900	51		3.0	25		14	0.2	0.0	12.0	1.7
75	29	01	EB2-2000	56		2.8	28		12	0.4	0.0	12.0	1.6
75	29	01	EB2-2100	59		2.6	28		14	0.3	0.0	11.7	1.7
75	29	01	EB2-2200	61		2.8	32		12	0.2	0.0	11.5	1.7
75	29	01	EB2-2300	56		2.3	33		12	0.2	0.0	11.4	1.4
75	29	01	EB2-2400	61		2.2	37		14	0.2	0.0	10.6	1.3
75	30	01	EB2-0100	59		2.3	39		14	0.2	0.0	11.2	1.3
75	30	01	EB2-0200	59		2.1	27		14	0.2	0.0	11.3	1.3
75	30	01	EB2-0300	50		2.8	31		13	0.2	0.0	11.3	2.2
75	30	01	EB2-0400	49		2.1	33		14	0.2	0.0	11.3	1.3
75	30	01	EB2-0500	50		2.3	26		11	0.2	0.0	11.4	1.8
75	30	01	EB2-0600	56		2.5	27		12	0.1	0.0	10.9	1.3
75	30	01	EB2-0700	58		2.3	30		10	0.1	0.0	11.8	1.4
75	30	01	EB2-0800	58		2.0	29		12	0.1	0.0	11.9	0.8
75	30	01	EB2-0900	53		1.7	29		11	0.4	0.0	12.0	0.8
75	10	02	EB2-C	42	8	10.3	56	5	16	6.8	0.2	10.0	9.5
75	10	02	NO MLSS TKN TAKEN										
75	20	02	EB2-C	135	16	9.2	49	4	16	4.8	0.3	27.7	5.6
75	20	02	MLB2-GAM			271.0							
75	26	02	EB2-C	65	6	3.5	51	4	18	2.0	1.0	75.0	2.6
75	26	02	MLB2-GAM			58.0							
75	03	03	EB2-C	56	7	2.4	38	3	11	0.5	0.0	34.0	1.2
75	03	03	MLB2-GAM			34.0							

ANALYSES

YEAR	DAY	MON	SAMPLE DESIGNATION	UNFILTERED COD	UNFILTERED BOD	UNFILTERED TKN	FILTERED COD	FILTERED BOD	FILTERED FOC	FILTERED NH3N	FILTERED NO2N	FILTERED NO3N	FILTERED TKN
75	04	03	EB2-C	57	6	1.4	40	3	90	0.4	0.0	12.1	1.1
75	04	03	MLB2-GAM			34.0							
75	05	03	EB2-C	92	12	3.3	43	4	12	8.6	0.3	4.7	1.7
75	05	03	MLB2-GAM			46.0							
75	06	03	NO MLSS TKN TAKEN										
75	06	03	EB2-C	94	10	6.7	44	3	19	3.1	0.1	14.0	4.8
75	07	03	EB2-C	93	10	6.7	49	4	12	4.6	0.3	11.2	5.6
75	07	03	MLB2-GAM			52.0							
75	08	03	MLB2-GAM			57.0							
75	03	03	EB2-0900				37			0.6	0.0	27.0	1.6
75	03	03	EB2-1200				34			0.1	0.0	28.0	1.0
75	03	03	EB2-1500				35			0.1	0.0	29.0	0.9
75	03	03	EB2-1800				44			0.1	0.0	35.0	1.0
75	03	03	EB2-2100				43			0.1	0.0	33.0	0.8
75	03	03	EB2-2400				43			0.1	0.0	35.0	0.7
75	04	03	EB2-0300				41			0.1	0.0	35.0	0.6
75	04	03	EB2-0600				43			0.1	0.0	34.0	0.8
75	04	03	EB2-0900	SAMPLE MISSED DUE TO AUTO SAMPLE ERROR									
75	04	03	EB2-1000				32			0.3	0.0	11.8	1.0
75	04	03	EB2-1200				33			0.1	0.0	11.7	0.9
75	04	03	EB2-1500				39			0.1	0.0	10.7	1.0
75	04	03	EB2-1800				43			0.1	0.0	12.0	1.4
75	04	03	EB2-2100				47			0.1	0.0	12.8	1.2
75	04	03	EB2 AUTO	SAMPLER MISSED SAMPLES 2200 TO 0900 MAR5 DUE TO BREAKDOWN									
75	05	03	EB2-0900				42			2.4	0.6	6.7	2.8
75	05	03	EB2-1200				39			0.3	0.1	6.3	0.9
75	05	03	EB2-1500				37			0.2	0.0	5.8	0.7
75	05	03	EB2-1800				36			0.2	0.0	6.5	0.9
75	05	03	EB2-2100				38			0.3	0.1	6.7	1.3
75	05	03	EB2-2400				42			0.5	0.1	6.9	1.5
75	06	03	EB2-0300				44			0.7	0.4	7.0	1.9
75	06	03	EB2-0600				44			1.1	0.4	6.9	2.2
75	06	03	EB2-0900				45			1.1	0.1	13.7	2.2
75	06	03	EB2-1200				44			0.6	0.0	14.0	1.3
75	06	03	EB2-1500				45			1.4	0.0	12.8	2.2
75	06	03	EB2-1800				44			2.6	0.1	13.3	3.7
75	06	03	EB2-2100				49			3.5	0.1	13.4	4.9
75	06	03	EB2-2400				52			3.5	0.1	13.6	4.9
75	07	03	EB2-0300				53			4.0	0.1	13.1	5.2
75	07	03	EB2-0600				44			4.2	0.1	12.6	5.1
75	07	03	EB2-0900				38			2.7	0.1	11.8	3.3
75	07	03	EB2-1200				38			1.4	0.1	12.6	2.4
75	07	03	EB2-1500				33			1.7	0.1	11.7	2.4
75	07	03	EB2-1800				36			3.0	0.2	12.2	3.5
75	07	03	EB2-2100				38			4.0	0.2	12.3	4.6
75	07	03	EB2-2400				48			5.6	0.2	12.0	6.3
75	08	03	EB2-0300				49			6.8	0.2	11.0	7.5
75	08	03	EB2-0600				58			8.3	0.4	9.4	8.6

ANALYSES

YEAR	DAY	MON	SAMPLE DESIGNATION	UNFILTERED COD	UNFILTERED BOD	UNFILTERED TKN	FILTERED COD	FILTERED BOD	FILTERED FOC	FILTERED NH3N	FILTERED NO2N	FILTERED NO3N	FILTERED TKN
75	11	03	EB2-C	79	9	3.8	76	2	11	0.8	0.0	14.0	1.0
75	11	03	MLB2-GAM			63.0							
75	12	03	EB2-C	94	11	10.6	42	46	12	7.3	0.0	11.5	8.4
75	12	03	MLB2-GAM			63.0							
75	13	03	EB2-C	174	25	23.4	61	14	23	14.0	0.5	1.7	17.7
75	13	03	MLB2-GAM			99.0							
75	14	03	EB2-C	92	9	18.2	60	5	15	13.4	0.8	2.7	15.6
75	14	03	MLB2-GAM			77.0							
75	15	03	EB2-C	77	8	20.3	46	4	13	13.6	0.2	2.8	16.1
75	15	03	MLB2-GAM			70.0							
75	16	03	EB2-C	77	7	14.7	45	4	16	10.0	0.8	6.7	12.9
75	16	03	MLB2-GAM			67.0							
75	17	03	EB2-C	84	9	10.8	31	4	14	6.6	1.9	11.9	8.1
75	17	03	MLB2-GAM			53.0							
75	18	03	EB2-C	99	13	6.3	51	4	10	3.6	3.4	13.6	4.1
75	18	03	MLB2-GAM			58.0							
75	19	03	MLB2-GAM			53.0							
75	11	03	EB2-0900				52			0.6	0.0	14.0	1.5
75	11	03	EB2-1200				47			0.4	0.0	14.9	1.7
75	11	03	EB2-1500				43			6.4	0.0	15.0	1.1
75	11	03	EB2-1800				45			0.7	0.0	16.0	1.4
75	11	03	EB2-2100				50			0.6	0.0	17.0	1.5
75	11	03	EB2-2400				59			0.6	0.0	16.0	1.4
75	12	03	EB2-0300				54			0.7	0.0	15.0	1.9
75	12	03	EB2-0600				51			0.6	0.1	2.1	1.7
75	12	03	EB2-0900				46			0.7	0.0	16.0	2.1
75	12	03	EB2-1200				47			0.4	0.0	16.0	1.5
75	12	03	EB2-1500				45			0.4	0.0	15.0	1.6
75	12	03	EB2-1800				31			2.0	0.0	18.0	3.2
75	12	03	EB2-2100				56			7.1	0.0	12.7	9.1
75	12	03	EB2-2400				55			11.5	0.0	9.7	14.1
75	13	03	EB2-0300				45			14.0	0.0	6.1	17.3
75	13	03	EB2-0600				63			15.0	0.0	3.8	18.8
75	13	03	EB2-0900				48			14.0	0.1	2.3	18.3
75	13	03	EB2-1200				53			12.0	0.1	2.1	16.9
75	13	03	EB2-1500				52			13.0	0.1	1.8	17.1
75	13	03	EB2-1800				49			15.0	0.3	1.8	18.4
75	13	03	EB2-2100				52			14.0	0.4	1.7	19.6
75	13	03	EB2-2400				54			16.0	0.5	1.7	18.4
75	14	03	EB2-0300				51			15.0	0.7	1.9	16.9
75	14	03	EB2-0600				48			13.0	0.8	2.0	15.1
75	14	03	EB2-0900				57			12.0	0.8	3.2	13.9
75	14	03	EB2-1200				54			10.2	0.8	3.7	11.7
75	14	03	EB2-1500				50			10.2	0.8	3.8	12.4
75	14	03	EB2-1800				52			13.4	1.0	4.2	15.8
75	14	03	EB2-2100				56			15.0	1.1	4.5	17.2
75	14	03	EB2-2400				56			16.0	1.1	4.3	18.1
75	15	03	EB2-0300				54			14.0	0.7	3.3	16.0

ANALYSES

YEAR	DAY	MON	SAMPLE DESIGNATION	UNFILTERED COD	UNFILTERED BOD	UNFILTERED TKN	FILTERED COD	FILTERED BOD	FILTERED FOC	FILTERED NH3N	FILTERED NO2N	FILTERED NO3N	FILTERED TKN
75	15	03	EB2-0600				56			14.0	0.6	3.2	16.3
75	15	03	EB2-0900				49			15.0	0.1	2.5	17.5
75	15	03	EB2-1200				44			14.0	0.0	2.3	16.9
75	15	03	EB2-1500				41			13.5	0.1	2.4	15.0
75	15	03	EB2-1800				43			13.0	0.1	3.0	15.1
75	15	03	EB2-2100				42			14.0	0.2	3.2	15.9
75	15	03	EB2-2400				47			13.8	0.3	3.4	15.8
75	16	03	EB2-0300				44			13.1	0.4	3.7	15.1
75	16	03	EB2-0600				43			11.7	0.5	4.1	13.9
75	16	03	EB2-0900				38			11.4	0.6	5.3	12.9
75	16	03	EB2-1200				44			10.3	0.6	5.8	11.9
75	16	03	EB2-1500				41			9.6	0.6	6.6	11.1
75	16	03	EB2-1800				40			10.4	0.8	7.2	12.5
75	16	03	EB2-2100				44			10.9	0.8	7.4	12.8
75	16	03	EB2-2400				29			10.7	1.0	8.0	12.8
75	17	03	EB2-0300				45			9.6	1.1	7.9	11.4
75	17	03	EB2-0600				41			8.7	1.2	8.2	10.6
75	17	03	EB2-0900				37			7.2	1.3	9.7	9.9
75	17	03	EB2-1200				42			5.7	1.4	7.4	7.7
75	17	03	EB2-1500				38			5.7	1.5	5.9	7.3
75	17	03	EB2-1800				34			7.2	1.9	11.1	9.6
75	17	03	EB2-2100				32			7.7	2.1	10.9	10.1
75	17	03	EB2-2400				46			7.3	2.5	10.5	9.7
75	18	03	EB2-0300				42			6.4	2.5	11.5	8.7
75	18	03	EB2-0600				48			5.2	2.7	10.3	7.1
75	18	03	EB2-0900				42			3.9	2.7	12.3	5.1
75	18	03	EB2-1200				37			2.1	2.9	13.1	4.1
75	18	03	EB2-1500				37			1.8	3.0	13.0	2.6
75	18	03	EB2-1800				37			3.3	3.1	12.9	4.7
75	18	03	EB2-2100				34			4.3	3.7	14.3	5.9
75	18	03	EB2-2400				35			5.0	4.3	13.7	6.6
75	19	03	EB2-0300				35			4.8	4.1	14.9	7.1
75	19	03	EB2-0600				35			4.3	4.2	11.8	6.2
75	24	03	EB2-C	99	13	3.7	33	5	15	0.8	0.2	8.1	1.4
75	24	03	MLB2-GAM			45.0							
75	25	03	EB2-C	85	11	3.0	40	4	12	1.8	0.7	7.1	2.4
75	25	03	MLB2-GAM			42.0							
75	26	03	EB2-C	79	8	2.7	33	3	12	0.5	0.4	8.8	1.1
75	26	03	MLB2-GAM			41.0							
75	27	03	EB2-C	102	13	3.4	39	3	10	0.8	0.2	7.7	1.0
75	27	03	MLB2-GAM			40.0							
75	24	03	EB2-0900				57			0.2	0.1	6.5	1.0
75	24	03	EB2-1200				22			0.1	0.1	8.2	0.9
75	24	03	EB2-1500				22			0.1	0.1	7.8	0.7
75	24	03	EB2-1800				24			0.1	0.4	8.6	0.6
75	24	03	EB2-2100				28			0.1	0.4	8.7	0.6
75	24	03	EB2-2400				25			0.1	0.2	8.6	1.1
75	25	03	EB2-0300				24			0.1	0.1	8.6	0.8

ANALYSES

SAMPLE				UNFILTERED			FILTERED						
YEAR	DAY	MON	DESIGNATION	COD	BOD	TKN	COD	BOD	FOC	NH3N	NO2N	NO3N	TKN
75	25	03	EB2-0600				25			0.2	0.1	8.4	0.9
75	25	03	EB2-0900				31			0.8	0.3	7.2	1.5
75	25	03	EB2-1200				29			0.0	0.1	5.6	0.3
75	25	03	EB2-1500				31			2.1	0.6	6.6	3.3
75	25	03	EB2-1800				34			5.0	0.8	6.1	5.1
75	25	03	EB2-2100				38			4.4	1.3	6.0	5.6
75	25	03	EB2-2400				41			2.0	1.6	7.0	2.9
75	26	03	EB2-0300				33			0.4	1.0	7.7	1.0
75	26	03	EB2-0600				34			0.2	0.2	7.2	0.7
75	26	03	EB2-0900				32			0.4	0.1	7.6	1.3
75	26	03	EB2-1200				33			0.6	0.1	7.5	1.4
75	26	03	EB2-1500				30			0.3	0.1	7.5	1.0
75	26	03	EB2-1800				31			0.4	0.4	9.3	1.1
75	26	03	EB2-2100				34			0.2	0.5	10.2	1.0
75	26	03	EB2-2400				39			0.1	0.4	9.9	0.8
75	27	03	EB2-0300				40			0.3	0.9	9.4	0.9
75	27	03	EB2-0600				36			0.3	0.6	9.3	1.1
75	27	03	EB2-0900				26			1.1	0.1	8.6	1.9
75	27	03	EB2-1200				29			0.7	0.1	8.5	1.6
75	27	03	EB2-1500				29			0.7	0.1	7.9	1.7
75	27	03	EB2-1800				28			0.7	0.1	9.4	1.1
75	27	03	EB2-2100				36			0.8	0.3	9.7	1.5
75	27	03	EB2-2400				42			0.8	0.4	9.5	1.4
75	28	03	EB2-0300				34			0.8	0.2	9.6	1.5
75	28	03	EB2-0600				22			0.8	0.1	9.6	1.3
75	07	04	EB2-C	77	10	3.8	48	5	13	0.4	0.4	13.5	2.4
75	07	04	ML02-GAM			44.0							
75	08	04	EB2-C	92	17	14.5	68	15	23	9.3	2.2	13.7	11.4
75	08	04	ML02-GAM			63.0							
75	09	04	EB2-C	62	6	2.5	39	4	14	0.5	0.2	13.5	1.0
75	09	04	ML32-GAM			40.0							
75	10	04	EB2-C	61	8	3.5	50	5	15	0.7	0.1	13.2	1.9
75	10	04	MLB2-GAM			44.0							
75	11	04	MLB2-GAM			46.0							
75	07	04	EB2-0900				108			8.0	0.0	10.7	8.7
75	07	04	EB2-1200				38			0.5	0.0	11.8	1.6
75	07	04	EB2-1500				38			0.5	0.0	12.8	0.7
75	07	04	EB2-1800				38			0.4	0.0	14.2	0.7
75	07	04	EB2-2100				40			0.5	0.0	15.2	1.1
75	07	04	EB2-2400				39			0.5	0.0	14.8	1.1
75	08	04	EB2-0300				41			0.5	0.0	14.0	1.2
75	08	04	EB2-0600				38			0.5	0.0	12.3	1.4
75	08	04	EB2-0900				48			0.5	0.0	10.7	2.0
75	08	04	EB2-1200				35			0.4	0.1	11.1	1.5
75	08	04	EB2-1500				61			8.6	1.7	9.3	14.3

ANALYSES

YEAR	DAY	MON	SAMPLE DESIGNATION	UNFILTERED COD	UNFILTERED BOD	UNFILTERED TKN	FILTERED COD	FILTERED BOD	FILTERED FOC	FILTERED NH3N	FILTERED NO2N	FILTERED NO3N	FILTERED TKN
75	08	04	EB2-1800				61			24.9	4.1	5.9	27.7
75	08	04	EB2-2100				102			28.7	5.7	3.3	30.0
75	08	04	EB2-2400				93			18.8	3.7	6.3	19.7
75	09	04	EB2-0300				68			10.2	3.4	7.6	11.2
75	09	04	EB2-0600				45			5.2	3.6	9.4	6.2
75	09	04	EB2-0900				23			1.1	1.8	13.3	1.8
75	09	04	EB2-1200				28			0.5	0.0	13.4	0.5
75	09	04	EB2-1500				27			0.4	0.0	12.9	0.4
75	09	04	EB2-1800				26			0.7	0.0	13.6	1.6
75	09	04	EB2-2100				32			0.2	0.0	13.6	1.5
75	09	04	EB2-2400				24			0.1	0.0	14.8	1.5
75	10	04	EB2-0300				21			0.4	0.1	14.7	1.5
75	10	04	EB2-0600				29			0.2	0.0	14.2	1.5
75	10	04	EB2-0900				36			0.3	0.2	12.0	1.7
75	10	04	EB2-1200				36			0.2	0.0	11.6	1.4
75	10	04	EB2-1500				39			0.3	0.0	11.9	0.9
75	10	04	EB2-1800				36			0.2	0.0	13.0	0.9
75	10	04	EB2-2100				42			0.4	0.0	12.7	1.3
75	10	04	EB2-2400				43			0.4	0.0	13.5	0.9
75	11	04	EB2-0300				47			0.5	0.0	13.6	1.2
75	11	04	EB2-0600				43			0.6	0.0	13.1	1.5
75	15	04	EB2-C	104	17	5.4	35	12	21	1.0	0.8	4.9	2.1
75	15	04	MLB2-GAM			49.0							
75	16	04	EB2-C		26	12.1	68	14	25	7.8	2.0	5.7	9.5
75	16	04	MLB2-GAM			53.5							
75	17	04	EB2-C	108	15	11.2	47	6	14	6.8	2.4	5.7	9.0
75	17	04	MLB2-GAM			54.5							
75	18	04	EB2-C				46	4	13	4.0	2.9	4.7	5.8
75	18	04	MLB2-GAM			48.0							
75	19	04	EB2-C	94	16	4.6	36	3	9	1.5	1.0	9.4	2.4
75	19	04	MLB2-GAM			27.0							
75	20	04	EB2-C	84	13	2.5	30	3	9	0.2	0.0	4.0	0.8
75	20	04	NO MLSS TKN DUE TO OPERATOR ERROR.										
75	21	04	EB2-C	80	13	5.4	40	3	9	1.3	1.5	17.5	4.1
75	21	04	MLB2-GAM			52.0							
75	22	04	EB2-C	102	21	13.9	43	3	10	9.3	2.7	17.3	10.2
75	22	04	MLB2-GAM			36.0							
75	23	04	EB2-C	108	30	7.7	41	3	14	2.1	1.0	14.0	7.4
75	23	04	MLB2-GAM			66.0							
75	24	04	EB2-C	139	21	9.6	47	7	15	4.0	0.2	11.2	6.2
75	24	04	MLB2-GAM			53.0							
75	25	04	MLB2-GAM			51.0							
75	15	04	EB2-1100				144		45	0.4	0.0	14.3	1.0
75	15	04	EB2-1300				53		12	0.3	0.0	12.0	0.8
75	15	04	EB2-1500				46		16	0.4	0.0	11.0	0.9
75	15	04	EB2-1700				25		11	0.9	0.0	11.8	1.3
75	15	04	EB2-1900				53		11	0.7	0.0	12.4	1.0
75	15	04	EB2-2100				47		12	0.6	0.0	13.5	1.4

ANALYSES

				UNFILTERED			FILTERED						
YEAR	DAY	MON	SAMPLE DESIGNATION	COD	BOD	TKN	COD	BOD	FOC	NH3N	NO2N	NO3N	TKN
75	15	04	EB2-2300				45		12	0.7	0.[illegible]	14.0	1.3
75	16	04	EB2-0100				75		16	1.1	1.7	13.2	1.6
75	16	04	EB2-0300				83		24	2.0	2.7	12.7	3.3
75	16	04	EB2-0500				92		31	2.1	2.7	12.1	3.1
75	16	04	EB2-0700				97		41	2.0	2.4	11.9	3.3
75	16	04	EB2-0900				88		36	1.6	1.0	11.0	2.5
75	16	04	EB2-1100				77		33	1.1	0.7	3.5	2.1
75	16	04	EB2-1300				73		33	0.7	0.9	4.1	1.3
75	16	04	EB2-1500				68		20	2.0	1.2	4.6	3.5
75	16	04	EB2-1700				73		16	5.8	1.4	4.8	6.7
75	16	04	EB2-1900				86		18	7.8	1.9	4.3	9.1
75	16	04	EB2-2100				93		22	8.7	2.2	3.8	9.4
75	16	04	EB2-2300				109		31	9.7	2.4	2.7	10.8
75	17	04	EB2-0100				114		28	10.0	2.8	3.3	11.1
75	17	04	EB2-0300				113		28	10.2	3.0	3.4	10.9
75	17	04	EB2-0500				102		24	10.6	3.2	3.9	11.7
75	17	04	EB2-0700				87		20	11.2	2.7	4.7	12.3
75	17	04	EB2-0900				74		16	10.8	2.1	5.3	11.5
75	17	04	EB2-1100				58		17	9.7	2.9	9.9	11.2
75	17	04	EB2-1300				48		13	12.3	1.8	10.6	14.7
75	17	04	EB2-1500				44		10	11.0	1.3	9.8	12.8
75	17	04	EB2-1700				42		17	7.9	1.1	9.0	9.0
75	17	04	EB2-1900				34		11	4.8	1.1	7.1	5.9
75	17	04	EB2-2100				30		16	2.6	1.7	6.8	3.7
75	17	04	EB2-2300				35		10	1.6	2.7	5.6	2.7
75	18	04	EB2-0100				38		10	2.3	4.1	4.2	3.6
75	18	04	EB2-0300				47		11	4.0	4.1	2.9	5.8
75	18	04	EB2-0500				52		14	6.2	3.0	2.1	8.2
75	18	04	EB2-0700				53		17	7.4	1.8	1.4	9.7
75	18	04	EB2-0900				59		23	7.4	1.3	1.4	9.9
75	18	04	EB2-1100				62		24	6.2	1.1	4.2	8.5
75	18	04	EB2-1300				63		22	4.0	1.9	5.8	6.0
75	18	04	EB2-1500				55		21	2.5	3.0	8.6	3.9
75	18	04	EB2-1700				46		12	0.7	3.2	11.4	1.9
75	18	04	EB2-1900				41		11	0.5	0.9	10.8	1.7
75	18	04	EB2-2100				38		11	0.5	0.0	10.5	1.2
75	18	04	EB2-2300				35		9	0.5	0.0	10.3	1.0
75	19	04	EB2-0100				39		9	0.7	0.3	10.1	1.2
75	19	04	EB2-0300				41		12	4.7	1.5	11.9	5.5
75	19	04	EB2-0500				44		12	8.6	1.7	12.4	10.0
75	19	04	EB2-0700				39		12	9.8	1.5	13.1	9.8
75	19	04	EB2-0900				39		9	9.0	1.4	14.0	9.2
75	19	04	EB2-1100				50		17	7.6	2.5	9.6	9.2
75	19	04	EB2-1400				40		11	5.0	3.3	12.7	6.2
75	19	04	EB2-1700				35		9	0.4	2.4	14.6	1.5
75	19	04	EB2-2000				32		11	0.2	0.2	13.5	1.0
75	19	04	EB2-2300				32		11	0.2	0.1	10.5	0.9
75	20	04	EB2-0200				31		9	0.2	0.0	8.0	1.0

ANALYSES

YEAR	DAY	MON	SAMPLE DESIGNATION	UNFILTERED COD	UNFILTERED BOD	UNFILTERED TKN	FILTERED COD	FILTERED BOD	FILTERED FOC	FILTERED NH3N	FILTERED NO2N	FILTERED NO3N	FILTERED TKN
75	20	04	EB2-0500				34		13	0.2	0.0	5.9	[illegible]
75	20	04	EB2-0800				34		11	0.2	0.0	6.7	1.1
75	20	04	EB2-1100				30		9	0.4	0.1	5.8	0.6
75	20	04	EB2-1400				26		8	0.3	0.0	4.9	0.3
75	20	04	EB2-1700				28		8	0.0	0.0	3.9	0.2
75	20	04	EB2-2000				29		8	0.1	0.0	3.8	0.2
75	20	04	EB2-2300				31		8	0.1	0.0	2.5	0.6
75	21	04	EB2-0200				31		8	0.0	0.0	2.2	0.4
75	21	04	EB2-0500				39		8	0.1	0.1	4.3	1.1
75	21	04	EB2-0800				43		9	0.1	0.0	5.5	1.0
75	21	04	EB2-1100				40		9	0.4	0.0	5.7	2.5
75	21	04	EB2-1400				38		11	0.1	0.0	7.4	2.0
75	21	04	EB2-1700				40		12	0.2	0.1	11.6	1.9
75	21	04	EB2-2000				35		11	0.3	0.6	15.4	2.2
75	21	04	EB2-2300				38		9	0.7	1.6	18.4	2.3
75	22	04	EB2-0200				35		10	1.2	2.2	19.8	2.8
75	22	04	EB2-0500				37		9	2.1	2.8	21.2	3.6
75	22	04	EB2-0800				36		9	2.6	3.2	22.8	4.2
75	22	04	EB2-1100				41		10	2.2	3.4	24.6	2.2
75	22	04	EB2-1400				42		11	9.4	3.2	19.8	10.3
75	22	04	EB2-1700				34		8	12.4	2.5	17.5	14.2
75	22	04	EB2-2000				39		12	11.6	2.7	15.3	13.2
75	22	04	EB2-2300				38		11	13.0	3.0	16.0	14.3
75	23	04	EB2-0200				37		10	13.0	2.9	17.1	14.9
75	23	04	EB2-0500				39		9	8.1	2.7	15.3	8.9
75	23	04	EB2-0800				35		11	2.5	2.6	14.4	3.2
75	23	04	EB2-1100				38		10	1.4	2.0	16.0	2.3
75	23	04	EB2-1300				39		12	2.1	2.9	18.1	3.6
75	23	04	EB2-1500				39		9	0.7	2.4	19.6	1.3
75	23	04	EB2-1700				40		10	0.5	0.7	15.1	1.2
75	23	04	EB2-1900				37		12	0.5	0.1	14.8	1.2
75	23	04	EB2-2100				36		11	0.4	0.0	14.6	0.9
75	23	04	EB2-2300				36		12	0.5	0.0	15.0	0.7
75	24	04	EB2-0100				75		10	0.5	0.3	12.3	1.1
75	24	04	EB2-0300				38		13	0.8	1.4	11.3	1.7
75	24	04	EB2-0500				38		12	2.6	1.3	12.1	3.5
75	24	04	EB2-0700				38		13	4.9	0.4	10.1	5.7
75	24	04	EB2-0900				40		13	6.1	0.2	8.6	7.5
75	24	04	EB2-1100				36		13	5.8	0.2	8.9	6.5
75	24	04	EB2-1300				35		12	5.3	0.2	10.7	6.0
75	24	04	EB2-1500				35		13	4.7	0.2	11.3	5.8
75	24	04	EB2-1700				35		11	4.4	0.1	12.8	5.6
75	24	04	EB2-1900				37		10	4.2	0.2	13.9	5.4
75	24	04	EB2-2100				37		10	3.2	0.1	13.3	4.5
75	24	04	EB2-2300				41		11	2.4	0.1	13.8	3.6
75	25	04	EB2-0100				41		9	2.6	0.1	11.8	3.8
75	25	04	EB2-0300				35		10	3.9	0.3	9.2	[illegible]
75	25	04	EB2-0500				45		18	5.3	0.4	9.0	6.2

ANALYSES

YEAR	DAY	MON	SAMPLE DESIGNATION	UNFILTERED COD	UNFILTERED BOD	UNFILTERED TKN	FILTERED COD	FILTERED BOD	FOC	NH3N	NO2N	NO3N	TKN
75	25	04	EB2-0700				48		17	5.4	0.5	8.8	6.8
75	25	04	EB2-0900				45		15	4.2	0.5	9.2	5.7
75			FOLLOWING ARE THE 2 HR RESULTS FROM 19/4 1100HRS TO 23/4 1100 HRS AS										
75			INTERPRETED FROM A CONTINUOUS RECORD DURING THIS PERIOD BASED ON 3 HR										
75			SAMPLES										
75	19	04	EB2-1100				50		17	7.6	2.5	9.6	9.2
75	19	04	EB2-1300				43		13	6.0	3.0	11.5	7.0
75	19	04	EB2-1500				38		10	3.5	3.0	13.0	4.0
75	19	04	EB2-1700				35		9	0.4	2.4	14.6	1.5
75	19	04	EB2-1900				33		10	0.3	1.0	14.0	1.2
75	19	04	EB2-2100				32		11	0.2	0.1	12.5	0.9
75	19	04	EB2-2300				32		11	0.2	0.1	10.5	0.9
75	20	04	EB2-0100				31		10	0.2	0.0	9.0	1.0
75	20	04	EB2-0300				32		11	0.2	0.0	7.5	1.0
75	20	04	EB2-0500				34		13	0.2	0.1	6.9	1.0
75	20	04	EB2-0700				34		12	0.2	0.0	6.8	1.1
75	20	04	EB2-0900				37		10	0.3	0.0	6.5	0.9
75	20	04	EB2-1100				30		9	0.4	0.1	5.8	0.6
75	20	04	EB2-1300				27		8	0.3	0.0	5.0	0.4
75	20	04	EB2-1500				27		8	0.2	0.0	4.5	0.3
75	20	04	EB2-1700				28		8	0.0	0.0	3.9	0.2
75	20	04	EB2-1900				28		6	0.0	0.0	3.8	0.2
75	20	04	EB2-2100				30		8	0.1	0.0	3.5	0.3
75	20	04	EB2-2300				31		8	0.1	0.0	2.5	0.6
75	21	04	EB2-0100				31		8	0.0	0.0	2.3	0.5
75	21	04	EB2-0300				34		8	0.1	0.0	3.0	0.7
75	21	04	EB2-0500				39		8	0.1	0.1	4.3	1.1
75	21	04	EB2-0700				42		9	0.1	0.0	5.0	1.0
75	21	04	EB2-0900				42		9	0.2	0.0	5.6	1.5
75	21	04	EB2-1100				40		9	0.4	0.0	5.7	2.5
75	21	04	EB2-1300				39		9	0.2	0.0	6.5	2.2
75	21	04	EB2-1500				39		11	0.1	0.0	8.5	2.0
75	21	04	EB2-1700				40		12	0.2	0.1	11.6	1.9
75	21	04	EB2-1900				35		11	0.2	0.4	14.0	2.0
75	21	04	EB2-2100				36		10	0.4	0.8	16.5	2.2
75	21	04	EB2-2300				38		9	0.7	1.6	18.4	2.3
75	22	04	EB2-0100				36		9	1.0	2.0	19.0	2.6
75	22	04	EB2-0300				36		9	1.5	2.5	20.0	3.0
75	22	04	EB2-0500				37		9	2.1	2.8	21.2	3.6
75	22	04	EB2-0700				36		9	2.5	3.0	22.0	4.0
75	22	04	EB2-0900				38		10	2.5	3.3	23.0	3.5
75	22	04	EB2-1100				41		10	2.2	3.4	24.6	2.2
75	22	04	EB2-1300				42		11	7.0	3.3	21.0	8.0
75	22	04	EB2-1500				39		10	10.5	3.0	19.0	11.5
75	22	04	EB2-1700				34		8	12.4	2.5	17.5	14.2
75	22	04	EB2-1900				38		11	12.0	2.6	15.0	13.5
75	22	04	EB2-2100				38		11	12.0	2.8	15.5	13.5
75	22	04	EB2-2300				38		11	13.0	3.0	16.0	14.3

ANALYSES

YEAR	DAY	MON	SAMPLE DESIGNATION	UNFILTERED COD	UNFILTERED BOD	UNFILTERED TKN	FILTERED COD	FILTERED BOD	FILTERED FOC	FILTERED NH3N	FILTERED NO2N	FILTERED NO3N	FILTERED TKN
75	23	04	EB2-0100				37		10	13.0	3.0	16.5	14.5
75	23	04	EB2-0300				38		10	11.0	2.8	16.0	12.5
75	23	04	EB2-0500				39		9	6.1	2.7	15.3	8.9
75	23	04	EB2-0700				36		10	4.0	2.6	15.0	5.0
75	23	04	EB2-0900				36		11	2.0	2.4	15.0	3.0
75	23	04	EB2-1100				38		10	1.4	2.0	15.0	2.3
75			END OF INTERPRETED RECORD										
75	05	05	EB2-C	90	19	16.2	55	4	15	10.5	10.2	24.8	13.0
75	05	05	MLB2-GAM			43.0							
75	07	05	EB2-C	96	21	12.1	69	5	13	9.1	4.0	28.0	9.9
75	07	05	MLB2-GAM			26.0							
75	12	05	EB2-C	104	14	6.8	41	6	12	2.5	0.4	9.9	3.8
75	12	05	MLB2-GAM			63.4							
75	13	05	EB2-C	143	40	17.1	45	9	17	9.2	0.6	5.8	11.6
75	13	05	MLB2-GAM			74.4							
75	14	05	EB2-C	87	25	12.1	46	9	10	9.7	0.6	6.1	10.7
75	14	05	MLB2-GAM			46.0							
75	15	05	EB2-C	161	26	20.3	56	10	46	12.7	1.2	6.6	15.3
75	15	05	MLB2-GAM			82.1							
75	12	05	EB2-0900				51		18	0.9	0.1	10.0	3.5
75	12	05	EB2-1200				25		8	0.2	0.1	10.6	0.8
75	12	05	EB2-1500				27		9	0.1	0.0	10.6	0.7
75	12	05	EB2-1800				26		9	0.1	0.1	11.4	0.6
75	12	05	EB2-2100				42		8	0.1	0.3	12.6	1.4
75	12	05	EB2-2400				41		9	2.4	0.7	11.2	4.4
75	13	05	EB2-0300				47		16	5.5	0.6	10.2	7.7
75	13	05	EB2-0600				49		15	7.0	0.6	9.0	9.3
75	13	05	EB2-0900				48		10	5.6	0.6	8.3	7.2
75	13	05	EB2-1200				40		9	5.7	0.5	7.6	6.7
75	13	05	EB2-1500				37		8	7.3	0.5	7.1	8.3
75	13	05	EB2-1800				37		11	10.7	0.6	6.8	12.2
75	13	05	EB2-2100				118		13	11.7	0.7	5.9	13.7
75	13	05	EB2-2400				69		24	11.1	0.8	4.7	13.8
75	14	05	EB2-0300				64		14	10.4	0.8	4.6	12.3
75	14	05	EB2-0600				52		11	9.2	0.8	4.7	10.7
75	14	05	EB2-0900				45		11	6.4	0.5	5.2	3.1
75	14	05	EB2-1200				39		8	4.9	0.4	6.4	5.9
75	14	05	EB2-1500				167		6	8.4	0.5	6.7	10.2
75	14	05	EB2-1800				92		8	12.1	0.6	5.1	13.5
75	14	05	EB2-2100				96		9	11.9	0.8	5.6	12.9
75	14	05	EB2-2400				105		13	11.6	0.8	4.9	12.8
75	15	05	EB2-0300				103		16	11.4	0.9	5.0	12.8
75	15	05	EB2-0600				63		13	10.5	0.9	4.8	12.1
75	15	05	EB2-0900				45		13	7.7	0.6	7.7	9.6
75	15	05	EB2-1200				40		11	6.3	0.7	9.1	7.1
75	15	05	EB2-1500				41		12	10.3	1.1	9.5	11.9
75	15	05	EB2-1800				50		18	15.3	1.3	8.1	16.8
75	15	05	EB2-2100				58		24	17.1	1.6	6.5	18.8

ANALYSES

YEAR	DAY	MON	SAMPLE DESIGNATION	UNFILTERED COD	UNFILTERED BOD	UNFILTERED TKN	FILTERED COD	FILTERED BOD	FILTERED FOC	FILTERED NH3N	FILTERED NO2N	FILTERED NO3N	FILTERED TKN
75	15	05	EB2-2400				119		26	17.3	1.7	5.5	19.2
75	16	05	EB2-0300				56		23	14.9	1.4	4.1	16.8
75	16	05	EB2-0600				54		17	13.2	1.3	3.8	15.8
75	26	05	EB2-C	112	21	7.8	52	9	15	0.7	0.5	13.5	4.8
75	26	05	MLB2-GAM			73.2							
75	27	05	EB2-C	149	31	9.1	59	19	27	0.7	0.9	12.5	5.9
75	27	05	MLB2-GAM			78.2							
75	28	05	EB2-C	105	18	5.0	58		21	0.7	0.2	7.1	3.1
75	28	05	MLB2-GAM			66.8							
75	29	05	EB2-C	85	11	3.4	46	5	15	1.1	0.1	8.7	2.3
75	29	05	MLB2-GAM			90.3							
75	26	05	EB2-0900				103		70	6.3	2.0	13.7	12.9
75	26	05	EB2-1200				35		13	0.2	0.0	11.1	1.5
75	26	05	EB2-1500				34		11	0.3	0.0	12.4	1.3
75	26	05	EB2-1800				37		11	0.2	0.1	13.2	1.1
75	26	05	EB2-2100				37		13	0.4	0.3	14.6	1.5
75	26	05	EB2-2400				44		21	0.5	1.0	13.0	2.9
75	27	05	EB2-0300				45		15	0.8	1.3	17.7	2.6
75	27	05	EB2-0600				43		14	0.6	1.1	14.5	3.3
75	27	05	EB2-0900				45		13	0.5	0.1	10.2	2.6
75	27	05	EB2-1200				39		12	0.4	0.1	9.8	2.3
75	27	05	EB2-1500				38		13	0.3	0.1	11.1	2.3
75	27	05	EB2-1800				47		20	0.2	0.1	11.7	2.3
75	27	05	EB2-2100				46		25	0.4	0.1	12.6	3.4
75	27	05	EB2-2400				105		42	0.7	1.4	15.6	6.3
75	28	05	EB2-0300				110		34	0.8	2.5	17.5	5.8
75	28	05	EB2-0600				69		38	1.3	2.8	17.2	5.7
75	28	05	EB2-0900				60		32	0.9	1.6	9.5	3.4
75	28	05	EB2-1200				49		29	0.4	0.5	8.2	1.9
75	28	05	EB2-1500				46		24	0.4	0.1	7.6	1.3
75	28	05	EB2-1800				45		21	0.3	0.1	7.2	2.1
75	28	05	EB2-2100				48		19	0.5	0.1	8.6	1.7
75	28	05	EB2-2400				47		19	0.5	0.1	9.1	1.7
75	29	05	EB2-0300				49		17	0.5	0.1	9.0	1.5
75	29	05	EB2-0600				46		17	0.5	0.1	8.3	1.5
75	29	05	EB2-0900				43		13	0.8	0.1	7.8	2.1
75	29	05	EB2-1200				46		13	0.6	0.1	8.1	2.1
75	29	05	EB2-1500				46		13	0.6	0.1	8.0	1.5
75	29	05	EB2-1800				40		12	0.5	0.1	8.1	1.4
75	29	05	EB2-2100				39		13	0.5	0.1	10.2	1.5
75	29	05	EB2-2400				42		14	0.7	0.1	10.6	2.1
75	30	05	EB2-0300				45		15	0.9	0.1	11.5	2.2
75	30	05	EB2-0600				42		14	1.0	0.1	10.2	2.5
75	02	06	EB2-C	84	12	3.8	31	5	13	0.2	0.1	12.8	1.5
75	02	06	MLB2-GAM			95.6							
75	03	06	EB2-C	89	12	10.2	38	5	13	7.0	1.4	13.6	7.2
75	03	06	MLB2-GAM			107.0							
75	04	06	EB2-C	80	6	12.5	47	4	14	11.7	3.5	26.4	12.5

ANALYSES

YEAR	DAY	MON	SAMPLE DESIGNATION	UNFILTERED COD	UNFILTERED BOD	UNFILTERED TKN	FILTERED COD	FILTERED BOD	FILTERED FOC	FILTERED NH3N	FILTERED NO2N	FILTERED NO3N	FILTERED TKN
75	04	06	MLB2-GAM			117.0							
75	05	06	EB2-C	84	15	11.9	48	7	13	8.7	4.3	21.7	8.9
75	05	06	MLB2-GAM			92.0							
75	02	06	EB2-0900				36		29	1.4	0.3	11.2	2.8
75	02	06	EB2-1200				27		13	0.0	0.1	12.6	0.1
75	02	06	EB2-1500				30		12	0.1	0.1	12.9	0.1
75	02	06	EB2-1800				35		12	0.1	0.1	14.1	0.1
75	02	06	EB2-2100				36		14	0.2	0.1	15.9	0.2
75	02	06	EB2-2400				37		15	0.4	0.1	13.8	0.7
75	03	06	EB2-0300				38		14	0.4	0.1	17.9	1.0
75	03	06	EB2-0600				35		13	0.4	0.1	14.7	1.2
75	03	06	EB2-0900	(INTERPRETED)									1.7
75	03	06	EB2-1200				36		11	0.6	0.0	11.3	2.2
75	03	06	EB2-1500				32		11	0.3	0.2	18.8	1.9
75	03	06	EB2-1800				35		11	2.5	1.2	23.8	4.3
75	03	06	EB2-2100				42		11	6.4	1.3	25.7	8.5
75	03	06	EB2-2400				44		9	9.2	1.7	26.3	11.8
75	04	06	EB2-0300				44		12	11.4	2.0	27.0	14.3
75	04	06	EB2-0600				47		13	11.8	2.3	25.7	15.6
75	04	06	EB2-0900				44		20	10.8	1.8	25.2	12.0
75	04	06	EB2-1200				40		13	9.0	2.4	28.6	10.9
75	04	06	EB2-1500				33		14	9.1	1.6	30.4	10.7
75	04	06	EB2-1800				40		18	10.1	3.2	18.8	12.0
75	04	06	EB2-2100				28		13	11.6	3.5	27.5	13.6
75	04	06	EB2-2400				40		14	11.9	4.4	27.6	14.0
75	05	06	EB2-0300				40		15	13.5	5.2	27.8	15.4
75	05	06	EB2-0600				44		14	12.2	5.6	27.4	14.9
75	05	06	EB2-0900				37		14	9.5	1.5	26.5	11.1
75	05	06	EB2-1200				28		11	7.0	4.2	25.8	8.5
75	05	06	EB2-1500				33		11	7.7	4.5	26.5	8.7
75	05	06	EB2-1800				33		14	8.7	0.7	30.3	9.9
75	05	06	EB2-2100				41		14	9.3	4.3	26.7	10.4
75	05	06	EB2-2400				37		13	9.3	4.9	26.1	10.1
75	06	06	EB2-0300				41		14	9.1	4.7	26.3	10.2
75	06	06	EB2-0600				49		13	8.2	0.3	26.2	9.9
75	20	06	EB2-C	92	23	6.5	44	2	17	2.5	6.0	68.0	3.2
75	20	06	MLB2-GAM			126.0							
75	01	07	EB*-C	58	18	2.0	47	2	15	0.4	1.8	22.2	1.5
75	01	07	MLB1*-GAM			34.0							
75	01	07	MLB3*-GAM			35.0							
75	01	07	MLB5*-GAM			32.0							
75	02	07	EB*-C	81	56	14.5	52	11	16	11.3	4.0	16.0	12.5
75	02	07	MLB1*-GAM			63.0							
75	02	07	MLB3*-GAM			57.3							
75	02	07	MLB5*-GAM			52.8							
75	03	07	EB*-C	76	9	4.5	56	4	13	1.3	4.3	16.7	3.3
75	03	07	MLB1*-GAM			104.8							
75	03	07	MLB3*-GAM			103.1							
75	03	07	MLB5*-GAM			69.0							

ANALYSES

YEAR	DAY	MON	SAMPLE DESIGNATION	UNFILTERED COD	UNFILTERED BOD	UNFILTERED TKN	FILTERED COD	FILTERED BOD	FILTERED FOC	FILTERED NH3N	FILTERED NO2N	FILTERED NO3N	FILTERED TKN
75	01	07	EB*-0900				42		21	0.9	0.9	16.1	2.7
75	01	07	EB*-1100				37		14	0.2	0.1	15.9	1.1
75	01	07	EB*-1300				40		14	0.1	0.1	15.9	1.0
75	01	07	EB*-1500				46		15	0.2	0.1	14.9	1.3
75	01	07	EB*-1700				48		16	0.2	0.2	14.8	1.3
75	01	07	EB*-1900				49		17	0.4	1.9	18.1	1.5
75	01	07	EB*-2100				51		17	0.5	3.9	16.1	2.0
75	01	07	EB*-2300				52		21	0.6	5.1	18.9	2.1
75	02	07	EB*-0100				59		16	0.3	4.6	18.4	2.0
75	02	07	EB*-0300				51		16	0.4	3.5	16.5	2.2
75	02	07	EB*-0500				44		15	0.3	1.6	16.4	1.7
75	02	07	EB*-0700				41		16	0.3	0.9	15.1	1.7
75	02	07	EB*-0900				39		14	0.5	0.3	12.8	1.5
75	02	07	EB*-1100				36		14	0.6	1.1	12.7	2.1
75	02	07	EB*-1300				38		14	5.5	1.9	12.4	8.0
75	02	07	EB*-1500				38		15	11.9	2.2	11.2	14.4
75	02	07	EB*-1700				44		16	18.0	3.3	11.7	23.8
75	02	07	EB*-1900				48		17	24.0	4.3	8.7	25.9
75	02	07	EB*-2100				51		17	24.0	4.3	11.7	25.8
75	02	07	EB*-2300				52		17	18.0	5.4	13.6	20.9
75	03	07	EB*-0100				48		17	13.1	6.1	15.9	14.3
75	03	07	EB*-0300				47		15	7.5	6.1	17.9	8.6
75	03	07	EB*-0500				42		17	3.1	6.9	18.1	4.5
75	03	07	EB*-0700				44		13	0.8	6.4	14.6	2.2
75	03	07	EB*-0900				48		12	0.5	4.0	15.0	1.3
75	03	07	EB*-1100				50		12	0.4	4.0	13.0	1.4
75	03	07	EB*-1300				43		13	0.4	3.4	14.6	1.4
75	03	07	EB*-1500				43		11	0.4	3.0	15.0	1.0
75	03	07	EB*-1700				45		12	0.5	4.2	15.8	1.3
75	03	07	EB*-1900				44		12	0.7	4.2	15.8	1.7
75	03	07	EB*-2100				46		14	3.0	5.1	13.9	4.9
75	03	07	EB*-2300				45		16	3.9	5.6	12.4	5.1
75	04	07	EB*-0100				48		12	3.2	5.8	15.2	4.9
75	04	07	EB*-0300				45		13	2.2	5.3	15.7	3.6
75	04	07	EB*-0500				49		15	1.5	5.7	13.3	2.9
75	04	07	EB*-0700				49		13	0.9	5.2	13.8	1.8

STOP

APPENDIX C

Pseudo "Steady-State" Experimental Run Results

The results of experiments designed to compare the separate and combined sludge systems (Table 4) together with the results of other pseudo "steady-state" experiments undertaken to allow for system design are summarized in Table C1.

Genuine Versus Non-Genuine Repeated Results

A certain number of the pseudo "steady-state" experiments were repeated in order to allow estimation of the variance associated with the results. Certain repeated experiments were carried out during another pseudo "steady-state" period from that of the original experiment ("genuine" repeats), others during the same period (non-"genuine" repeats). In comparing the rate results (Table C2) there is no evidence to necessitate differentiating between "genuine" and non-"genuine" repeats.

Nitrification Rate and Ammonia Concentration Relationship

At 15°C and 4 day SRT the combined sludge system rate data indicates no dependence on ammonia concentration down to values approaching 0.5 mg/l NH_4^+-N (Figure C1, Table C3).

Effect of NO_3^--N on Analytical Determination of Filterable Organic Nitrogen

It has been stated (Parkin and McCarty, 1975) that the analytical determination of filterable organic nitrogen may be interfered with by the presence of NO_3^--N leading to an apparent lower value than actually present. The low concentrations of filterable organic nitrogen analytically determined in this research were independent of the concentration of NO_3^--N present (Figure C2).

Nitrification - HRT Relationship

The pseudo "steady-state" relationships developed between filterable TKN removal and temperature imply an independence on hydraulic residence time (HRT). The pseudo "steady-state" models developed at a

TABLE C1 PSEUDO "STEADY-STATE" EXPERIMENTAL RESULTS

Run No.	Date	System Conditions Temp °C	System Conditions Detention Time hrs	System Solids Retention Time - days SSC	TSS	TSC	System Nitrification Rate g Filterable TKN / g MLVSS - day SSC	TSS	TSC	System TKN Removal mg/l Filterable TKN SSC	TSS	TSC
	(1973)											
PSS- 1	15/11	6	4	7	7		0.009	0.011		5.6	7.6	
PSS- 2	19/11	5	4	7			0.006			3.9		
PSS- 3	20/11	5	4	7	7		0.004	0.009		2.9	5.9	
PSS- 4	27/11	5	4			7			0.003			1.7
PSS- 5	29/11	5	4			7			0.005			3.2
	(1974)											
PSS- 6	29/01	5	4	4	4		0.003	0.005		1.5	3.0	
PSS- 7	31/01	5	4	4	4		0.004	0.005		2.2	2.9	
PSS- 8	04/02	5	4	4	4		0.005	0.008		3.0	3.3	
PSS- 9	11/02	10	4		7	4		0.030	0.026		15.1	16.3
PSS-10	19/02	7	4		4	4		0.013	0.011		5.7	5.1
PSS-11	21/02	10	4		4	4		0.021	0.020		12.1	11.2

TABLE C1 (Cont'd)

Run No.	Date	System Conditions Temp °C	Detention Time hrs	System Solids Retention Time days SSC	TSS	TSC	System Nitrification Rate g Filterable TKN / g MLVSS - day SSC	TSS	TSC	System TKN Removal mg/l Filterable TKN SSC	TSS	TSC
PSS-12	27/02	15	4		4	4		0.053	0.032		19.7	17.8
PSS-13	10/04	15	6.4		10	10		0.037	0.025		23.9	22.8
PSS-14	16/04	5	6.4		10	10		0.022	0.014		16.5	15.4
PSS-15	18/04	5	6.4		10	10		0.021	0.012		17.5	13.7
PSS-16	01/05	20	6.4	10	10		0.031	0.053		30.0	32.9	
PSS-17	21/05	6	4		7	7		0.019	0.013		6.6	6.2
PSS-18	04/06	7	5	7	7		0.007	0.008		6.1	5.8	
PSS-19	06/06	7	5	7	7		0.0002	0.012		0.2	7.8	
PSS-20	13/06	10	5	7	7		0.014	0.022		12.5	17.8	
PSS-21	18/06	10	5		7	7		0.028	0.018		17.1	16.1
PSS-22	20/06	10	5		7	7		0.037	0.021		17.9	18.4
PSS-23	28/06	15	5		7	7		0.048	0.031		29.9	29.9

TABLE C1 (Cont'd)

Run No.	Date	System Conditions		System Solids Retention Time - days			System Nitrification Rate g Filterable TKN / g MLVSS - day			System TKN Removal mg/l Filterable TKN		
		Temp °C	Detention Time hrs	SSC	TSS	TSC	SSC	TSS	TSC	SSC	TSS	TSC
PSS-24	02/07	15	5	7	7		0.029	0.052		27.9	26.3	
PSS-25	05/07	15	5	7	7		0.029	0.068		28.4	27.4	
PSS-26	10/07	8	5		7	7		0.027	0.014		15.9	11.4
PSS-27	12/07	8	5		7	7		0.022	0.014		16.2	12.9
PSS-28	16/07	15	4	4	4		0.029	0.052		18.1	24.5	
PSS-29	18/07	15	4	4	4		0.031	0.049		23.1	25.6	
PSS-30	22/07	15	4		4	4		0.0637	0.032		22.1	20.7
PSS-31	30/07	20	5		7	7		0.086	0.044		38.1	40.1
PSS-32	06/08	20	5		7	7		0.060	0.036		35.6	35.1
PSS-33	08/08	20	5			7			0.030			28.9
PSS-34	13/08	20	5	7	7		0.030	0.064		27.7	28.7	
PSS-35	15/08	20	5	7	7		0.040	0.082		32.8	32.4	

TABLE C1 (Cont'd)

Run No.	Date	System Conditions Temp °C	System Conditions Detention Time hrs	System Solids Retention Time - days SSC	TSS	TSC	System Nitrification Rate g Filterable TKN / g MLVSS - day SSC	TSS	TSC	System TKN Removal mg/l Filterable TKN SSC	TSS	TSC
PSS-36	20/08	12	5	7	7		0.026	0.051		22.2	20.8	
PSS-37	22/08	13	5	7	7		0.033	0.058		29.6	30.4	
PSS-39	29/08	7	5		7			0.016			11.2	
PSS-40*	06/09	25	5	7			0.035					
PSS-41*	10/09	25	5	7			0.034					
PSS-42	17/09	20	4			4			0.045			30.5
PSS-43	19/09	20	4			4			0.054			36.1
PSS-44	25/09	20	4		4	4		0.085	0.059		41.3	37.1
PSS-45	27/09	20	4		4	4		0.099	0.058		41.8	37.3
PSS-46	03/10	8	5		7			0.026			18.0	
PSS-47	08/10	8	5		4			0.026			22.8	
PSS-48	10/10	8	5		4			0.029			21.9	

TABLE C1 (Cont'd)

Run No.	Date	System Conditions Temp °C	System Conditions Detention Time hrs	System Solids Retention Time - days SSC	TSS	TSC	System Nitrification Rate g Filterable TKN / g MLVSS - day SSC	TSS	TSC	System TKN Removal mg/l Filterable TKN SSC	TSS	TSC
PSS-49	18/10	20	4		4	4		0.069	0.038		26.8	24.3
PSS-50*	25/10	25	4			4			0.057			
PSS-51*	28/10	25	4	4			0.060					
PSS-52	04/11	25	5	7	7		0.048	0.129		55.3	48.7	
PSS-53	06/11	25	5		7	7		0.164	0.057		56.4	57.4
PSS-54	13/11	25	6.4		10	10		0.150	0.062		63.9	73.1
PSS-55	15/11	25	6.4	10	10		0.071	0.213		82.6	76.6	
PSS-56	25/11	12	6.4		10	10		0.068	0.032		33.4	33.4
PSS-57	27/11 (1975)	10	6.4	10	10		0.022	0.039		21.4	22.1	
PSS-58	10/02	10	4	4	4		0.024	0.038		12.4	15.1	
PSS-59	20/02	10	6.4		10	10		0.050	0.020		30.4	21.8
PSS-60	26/02	15	6.4	10	10		0.034	0.077		32.1	32.5	

TABLE C1 (Cont'd)

Run No.	Date	System Conditions Temp °C	Detention Time hrs	System Solids Retention Time - days			System Nitrification Rate g Filterable TKN / g MLVSS - day			System TKN Removal mg/l Filterable TKN		
				SSC	TSS	TSC	SSC	TSS	TSC	SSC	TSS	TSC
PSS-61	05/05	25	4	4	4		0.117	0.271		47.1	42.1	
PSS-62	07/05	.25	4		4	4		0.261	0.135		42.6	49.8
PSS-63	20/06	20	6.4		10	10		0.130	0.052		48.9	47.8

Note: *Reactor DO less than 2.0 mg/l during part of day therefore not "pseudo" steady-state conditions.

TABLE C2 GENUINE VERSUS NON-GENUINE REPEATED EXPERIMENTS

Run No.	Date	System Conditions Temp. °C	System Conditions Detention Time hrs	TSS System Solids Retention Time days	Nitrification Rate g Filterable TKN / g MLVSS - day
	(1974)				
PSS- 9	11/2	10	5	7	0.030
PSS-18	4/6	7	5	7	0.008
PSS-19	6/6	7	5	7	0.012
PSS-20	13/6	10	5	7	0.022
PSS-21	18/6	10	5	7	0.028
PSS-22	20/6	10	5	7	0.037
PSS-23	28/6	15	5	7	0.048
PSS-24	2/7	15	5	7	0.052
PSS-25	5/7	15	5	7	0.068
PSS-26	10/7	8	5	7	0.027
PSS-27	12/7	8	5	7	0.022
PSS-31	30/7	20	5	7	0.086
PSS-32	6/8	20	5	7	0.060
PSS-34	13/8	20	5	7	0.064
PSS-35	15/8	20	5	7	0.082
PSS-39	29/8	7	5	7	0.016
PSS-46	3/10	8	5	7	0.026

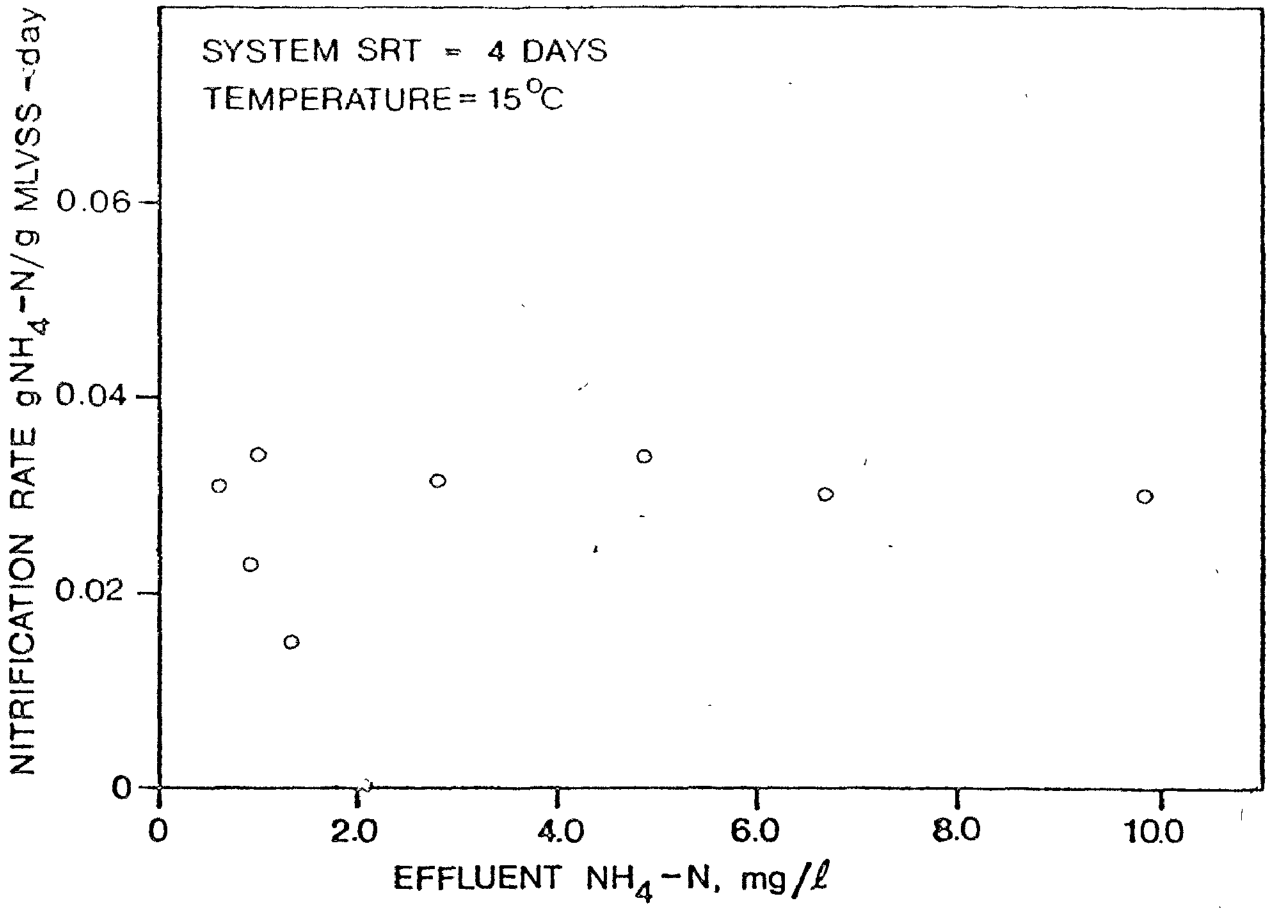

FIG. C1 INDEPENDENCE OF NITRIFICATION RATE AND AMMONIA CONCENTRATION

TABLE C3 COMBINED SLUDGE SYSTEM RATE DEPENDENCY ON AMMONIA CONCENTRATION

Run No.	Date	System Temp. °C	System Solids Retention Time days	Effluent NH_4-N mg/l	Nitrification Rate $\frac{\text{g Filterable } NH_4\text{-N}}{\text{g MLVSS - day}}$
	(1974)				
PSS-12	27/2	15	4	2.8	0.032
PSS-28	16/7	15	4	9.8	0.030
PSS-29	18/7	15	4	4.9	0.034
PSS-30	22/7	15	4	6.7	0.030
	(1975)				
* D-1	3/3	15	4	0.6	0.032
* D-2	11/3	15	4	1.0	0.034
* D-3	24/3	15	4	1.3	0.015
* D-4	7/4	15	4	0.9	0.023

Note: *Pseudo "steady-state" baseline day of dynamic run.

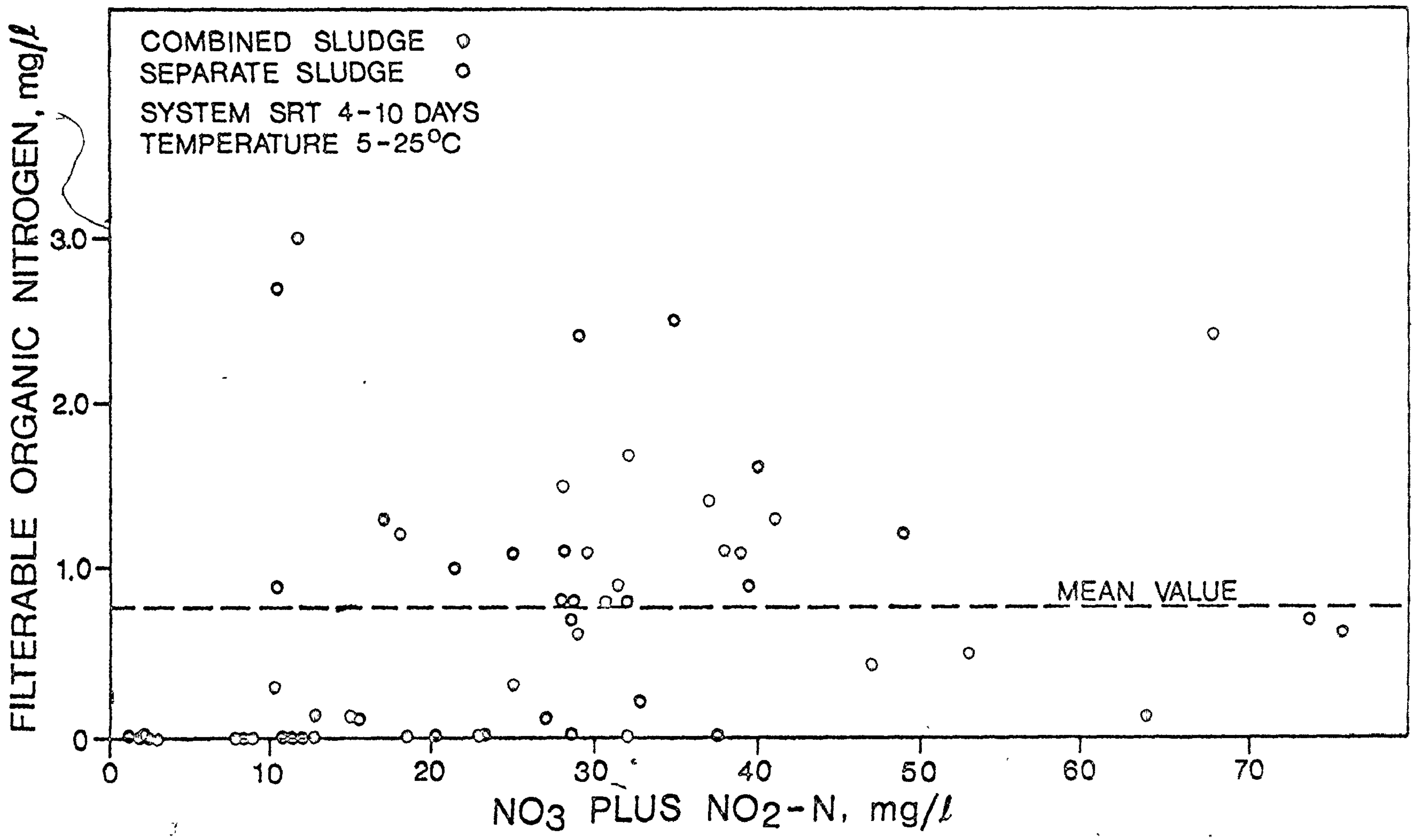

FIG. C2 EFFECT OF OXIDIZED NITROGEN ON FILTERABLE ORGANIC NITROGEN DETERMINATION four day SSRT involved operating at an HRT of four hours. No difference in TKN removal was observed at an eight hour HRT under equal SRT and temperature conditions (Table C4.)

TABLE C4 VERIFICATION OF FILTERABLE TKN REMOVAL - SRT-TEMPERATURE RELATIONSHIP

Run No.	Date	Sludge System	System Conditions Temp °C	HRT hrs	SRT days	Filterable TKN Removal Observed mg/l	**Model Prediction mg/l
	(1975)						
*D-6	12/5	SSC	13	8	4	19.9	16.3
*D-7	26/5	SSC	13	8	4	15.8	16.3
*D-8	2/6	SSC	13	8	4	16.0	16.3
*D-6	12/5	TSS	13	8	4	21.5	20.2
*D-7	26/5	TSS	13	8	4	18.9	20.2
*D-8	2/6	TSS	13	8	4	19.4	20.2

Note: *Pseudo "steady-state" baseline day of dynamic run.

**Predictions based on filterable TKN removal models (HRT=4 hrs);

Combined sludge system: $K= 2.52 \times 10^{13}\ e^{-15950/RT}$

Separate sludge system: $K= 2.98 \times 10^{10}\ e^{-12000/RT}$

APPENDIX D

Mixing Characteristics of Reactors

In order to describe the mixing characteristics in the dispersed aeration tanks two flow models were used to interpret tracer response results.

Tanks in series model

The particular flow patterns which produce the effluent dye concentration curves in tracer studies can often be approximated by effluent concentrations predicted for a number of equal sized continuous stirred tanks in series (CSTR's).

The final effluent of a system of j equal sized CSTR's can be found from the following equation:

$$\frac{C}{C_o} = \frac{j^j (j\theta)^{j-1}}{(j-1)!} e^{-j\theta} \qquad \text{..........(46)}$$

where: C = effluent tracer concentrations

θ = dimensionless time

j = number of tanks

C_o = the quantity of tracer added divided by the volume of the entire system

This applies only to a pulse input of tracer. In this type of system, as j approaches large values (say 15), the flow regime approximates plug flow whereas, when j is equal to 1, the flow is completely mixed. If the time at which the peak dye concentration occurs is shown, the above equation can be solved for j by taking the derivative and equating the result to zero. Theta peak is determined by dividing the peak time by the residence time. The final form of the equation is:

$$j = \frac{1}{1 - \theta} \qquad \text{..........(47)}$$

Dispersion model

The dispersion model is developed in such a way that it assumes plug flow with the inclusion of a term which describes the degree of molecular dispersion or deviation from the ideal. The general equation for this model is:

$$\frac{D^2C}{x^2} - \frac{u\,C}{x} - \frac{C}{t} = 0 \qquad \text{..........(48)}$$

Where: u = mean displacement velocity

C = concentration

$\frac{C}{x}$ = concentration gradient

$\frac{C}{t}$ = reaction term

D = turbulence expression

The solution of this equation for a tracer pulse input to a closed vessel given by Mujachi (1953) is quoted by Timpany (1966).

$$\frac{C}{C_o} = 2\sum_{n=1}^{\infty} \frac{U_n(U \sin U_n + U_n \cos n)}{(U^2 + 2U + U_n^2)} \text{ EXP } U - \frac{(U^2 + U_n^2)}{2U}\,\theta \qquad \text{..........(49)}$$

where: $U_n = \text{COT}^{-1}\left(\frac{U_n}{U} - \frac{U}{U_n}\right)/2$

$U = \frac{uL}{2D}$

L = tank length

The value U_n is best calculated by trial and error using an iterative approach. Also, the summation in equation forty-eight is taken to some reasonably large but finite value for practical purposes.

Instead of determining a value for D by the normal variance technique suggested by Levenspiel (1967), a correlation between peak time and D/uL developed by Timpany (1966) has been used. Proper use of the variance method for D/uL calculation generally requires concentration data to be entered to at least seven detention times.

This is rarely practical.

Mixing studies

The mixing characteristics of the single, two-stage, and five-stage combined sludge reactors (SSC, TSC and FSC) were established by the use of dye or tracer response methods. In addition the mixing regime in the first stage of the two-stage separate sludge system was determined.

All dye studies were conducted with a Turner Model 111 continuous flow fluorometer. The dye used in each run was prepared from 50% by weight stock Rodamine WT. Previous to the dye studies the mixed-liquor suspended solids were removed from the reactors and the testing conducted using tap water at approximately 8^{o}C. Calibration curves were determined for the four fluorometer scales using dye solutions of known concentration at 8^{o}C. To initiate each study a known slug of dye was added to the tank inlet through a tube immersed six inches below the liquid level. Halfway through the addition period (five sec) the dye test was assumed to begin. The effluent dye concentration was measured at the outlet weir by pumping 280 ml/min of effluent through the fluorometer located within three feet of the sampling point. The fluorometer was connected to a Fischer Recordall Series 200 recorder.

The results and further details of each dye study are included in Tables D1, D2, D3 and D4 together with a listing of the computer program (Table D5) utilized in the analyses.

TABLE D1 TRACER RESPONSE ANALYSIS FOR SSC SLUDGE REACTOR (2/1/75)

TEST METHOD USING A PULSE INPUT OF RODAMINE WT DYE

REACTOR OPERATION AND TEST CONDITIONS

VOLUME OF REACTOR	=	2184.[illegible]LITRES
HYDRAULIC LOADING	=	7.28LITRES/MIN
THEORETICAL DET	=	3[illegible].[illegible]MIN
DYE INJECTION	=	0.184[illegible]LITRES
CONC OF DYE ADDED	=	[illegible].238E+[illegible]7PPB
DYE / TANK VOLUME	=	2[illegible].51PPB

TEST RESULTS AND CALCULATED VALUES

DYE PEAK TIME	=	4.30MIN
PEAK/THEOR DET	=	[illegible].013
PEAK/MEAN DYE RES	=	0.036MIN
MEAN DYE RESIDENCE	=	1[illegible]0.03MIN
PER DYE RECOVERY	=	93.447[illegible]
FR. STAGNANT ZONE	=	[illegible].633
CSTR S IN SERIES USING THEORETICAL RES.	=	1.01
CSTR S IN SERIES USING MEAN DYE RES.	=	1.[illegible]4
D/UL VALUE USING THEORETICAL RESIDENCE	=	0.6510E+02
D/UL VALUE USING MEAN DYE RESIDENCE	=	[illegible].1697E+02

TABLE D1 (Cont'd)

EXPERIMENTAL RESULTS C/CO VERSUS THETA

THETA	C/CO
0.100	5.889
0.200	0.817
0.300	0.720
0.400	0.629
0.500	0.550
0.600	0.482
0.700	0.419
0.800	0.357
0.900	0.315
1.000	0.263
1.100	0.232
1.200	0.201
1.300	0.174
1.400	0.150
1.500	0.129
1.600	0.111
1.700	0.099
1.800	0.086
1.900	0.075
2.000	0.065
2.100	0.056
2.200	0.048
2.300	0.043
2.400	0.036
2.500	0.031
2.600	0.027
2.700	0.024
2.800	0.020
2.900	0.017
3.000	0.016
3.333	0.009
3.667	0.006
4.000	0.004

TABLE D1 (Cont'd)

CALCULATED C/CO VERSUS THETA VALUES
FOR CSTR IN SERIES MODEL

THEORETICAL DETENTION		ACTUAL DETENTION	
THETA	C/CO	THETA	C/CO
0.000	1.000	0.000	1.000
0.050	0.951	0.050	0.951
0.100	0.905	0.100	0.905
0.150	0.861	0.150	0.861
0.200	0.819	0.200	0.819
0.250	0.779	0.250	0.779
0.300	0.741	0.300	0.741
0.350	0.705	0.350	0.705
0.400	0.670	0.400	0.670
0.450	0.638	0.450	0.638
0.500	0.607	0.500	0.607
0.550	0.577	0.550	0.577
0.600	0.549	0.600	0.549
0.650	0.522	0.650	0.522
0.700	0.497	0.700	0.497
0.750	0.472	0.750	0.472
0.800	0.449	0.800	0.449
0.850	0.427	0.850	0.427
0.900	0.407	0.900	0.407
0.950	0.387	0.950	0.387
1.000	0.368	1.000	0.368
1.200	0.301	1.200	0.301
1.400	0.247	1.400	0.247
1.600	0.202	1.600	0.202
1.800	0.165	1.800	0.165
2.000	0.135	2.000	0.135
2.200	0.111	2.200	0.111
2.400	0.091	2.400	0.091
2.600	0.074	2.600	0.074
2.800	0.061	2.800	0.061
3.000	0.050	3.000	0.050
3.200	0.041	3.200	0.041
3.400	0.033	3.400	0.033
3.600	0.027	3.600	0.027
3.800	0.022	3.800	0.022
4.000	0.018	4.000	0.018
4.200	0.015	4.200	0.015

TABLE D1 (Cont'd)

CALCULATED C/CO VERSUS THETA VALUES FOR DISPERSION MODEL

THEORETICAL DETENTION		ACTUAL DETENTION	
0.100	0.929	0.100	0.922
0.200	0.823	0.200	0.833
0.300	0.744	0.300	0.753
0.400	0.673	0.400	0.681
0.500	0.609	0.500	0.615
0.600	0.551	0.600	0.556
0.700	0.498	0.700	0.503
0.800	0.451	0.800	0.455
0.900	0.408	0.900	0.411
1.000	0.369	1.000	0.372
1.100	0.334	1.100	0.335
1.200	0.302	1.200	0.304
1.300	0.273	1.300	0.274
1.400	0.247	1.400	0.248
1.500	0.223	1.500	0.224
1.600	0.202	1.600	0.203
1.700	0.183	1.700	0.183
1.800	0.165	1.800	0.166
1.900	0.150	1.900	0.151
2.000	0.135	2.000	0.135
2.100	0.122	2.100	0.122
2.200	0.111	2.200	0.111
2.300	0.100	2.300	0.101
2.400	0.091	2.400	0.090
2.500	0.082	2.500	0.082
2.600	0.074	2.600	0.074
2.700	0.067	2.700	0.067
2.800	0.061	2.800	[illegible]
2.900	0.055	2.900	0.055
3.000	0.050	3.000	0.049

TABLE D2 TRACER RESPONSE ANALYSIS FOR TSC SLUDGE REACTOR (6/1/75)

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TEST METHOD USING A PULSE INPUT OF RODAMINE WT DYE

REACTOR OPERATION AND TEST CONDITIONS

VOLUME OF REACTOR = 2184.00LITRES
HYDRAULIC LOADING =    7.28LITRES/MIN
THEORETICAL DET   =  300.00MIN
DYE INJECTION     =  0.1840LITRES
CONC OF DYE ADDED =  0.238E+07PPB
DYE / TANK VOLUME =  200.51PPB

TEST RESULTS AND CALCULATED VALUES

DYE PEAK TIME       =  120.00MIN
PEAK/THEOR DET      =    0.400

PEAK/MEAN DYE RES =   0.606MIN
MEAN DYE RESIDENCE = 198.00MIN
PER DYE RECOVERY  =  81.884
FR. STAGNANT ZONE =   0.340

CSTR S IN SERIES USING THEORETICAL RES.  =    1.67
CSTR S IN SERIES USING MEAN DYE RES.     =    2.54
D/UL VALUE USING THEORETICAL RESIDENCE   =  0.5875E+00
D/UL VALUE USING MEAN DYE RESIDENCE      =  0.2179E+00
```

TABLE D2 (Cont'd)

EXPERIMENTAL RESULTS C/CO VERSUS THETA

THETA	C/CO
0.060	0.273
0.120	0.487
0.180	0.621
0.240	0.768
0.300	0.753
0.360	0.772
0.420	0.769
0.480	0.759
0.540	0.746
0.600	0.714
0.660	0.671
0.720	0.620
0.780	0.569
0.840	0.519
0.900	0.473
0.960	0.430
1.020	0.393
1.080	0.363
1.140	0.336
1.200	0.292
1.260	0.267
1.320	0.246
1.380	0.219
1.440	0.199
1.500	0.179
1.560	0.162
1.620	0.144
1.680	0.125
1.740	0.112
1.800	0.098
2.000	0.064
2.200	0.044
2.400	0.025
2.600	0.012

TABLE D2 (Cont'd)

CALCULATED C/CO VERSUS THETA VALUES
FOR CSTR IN SERIES MODEL

THEORETICAL DETENTION		ACTUAL DETENTION	
THETA	C/CO	THETA	C/CO
0.000	0.000	0.000	0.000
0.050	0.131	0.050	0.029
0.100	0.327	0.100	0.103
0.150	0.444	0.150	0.194
0.200	0.536	0.200	0.295
0.250	0.607	0.250	0.399
0.300	0.659	0.300	0.494
0.350	0.695	0.350	0.579
0.400	0.719	0.400	0.651
0.450	0.732	0.450	0.709
0.500	0.736	0.500	0.753
0.550	0.732	0.550	0.784
0.600	0.723	0.600	0.803
0.650	0.709	0.650	0.811
0.700	0.690	0.700	0.813
0.750	0.669	0.750	0.800
0.800	0.646	0.800	0.784
0.850	0.621	0.850	0.762
0.900	0.595	0.900	0.735
0.950	0.568	0.950	0.705
1.000	0.541	1.000	0.672
1.200	0.435	1.200	0.531
1.400	0.341	1.400	0.397
1.600	0.261	1.600	0.284
1.800	0.197	1.800	0.198
2.000	0.147	2.000	0.134
2.200	0.108	2.200	0.083
2.400	0.079	2.400	0.058
2.600	0.057	2.600	0.037
2.800	0.041	2.800	0.024
3.000	0.030	3.000	0.015
3.200	0.021	3.200	0.009
3.400	0.015	3.400	0.006
3.600	0.011	3.600	0.004
3.800	0.008	3.800	0.002
4.000	0.005	4.000	0.001
4.200	0.004	4.200	0.001

TABLE D2 (Cont'd)

CALCULATED C/CO VERSUS THETA VALUES FOR DISPERSION MODEL

THEORETICAL DETENTION		ACTUAL DETENTION	
0.100	0.124	0.100	0.001
0.200	0.612	0.200	0.[illegible]97
0.300	0.855	0.300	0.415
0.400	0.9[illegible]2	0.400	0.729
0.500	0.859	0.500	0.912
0.600	0.795	0.600	0.968
0.700	0.7[illegible]3	0.700	0.941
0.800	0.623	0.800	0.868
0.900	0.55[illegible]	0.900	0.774
1.000	0.484	1.000	0.676
1.100	0.426	1.100	0.582
1.200	0.374	1.200	0.495
1.300	0.329	1.300	0.419
1.400	0.289	1.400	0.353
1.500	0.254	1.500	0.295
1.600	0.223	1.600	0.247
1.700	0.136	1.700	0.205
1.800	0.172	1.800	0.172
1.900	0.151	1.900	0.143
2.000	0.133	2.000	0.119
2.100	0.116	2.100	0.099
2.200	0.102	2.200	0.082
2.300	0.090	2.300	0.069
2.400	0.079	2.400	0.057
2.500	0.069	2.500	0.047
2.600	0.061	2.600	0.039
2.700	0.053	2.700	0.033
2.800	0.047	2.800	0.027
2.900	0.041	2.900	0.023
3.000	0.036	3.000	0.019

TABLE D3 TRACER RESPONSE ANALYSIS FOR FSC SLUDGE REACTOR (8/7/75)

TEST METHOD USING A PULSE INPUT OF RODAMINE WT DYE

REACTOR OPERATION AND TEST CONDITIONS

VOLUME OF REACTOR	=	2184.00LITRES
HYDRAULIC LOADING	=	7.28LITRES/MIN
THEORETICAL DET	=	300.00MIN
DYE INJECTION	=	0.0600LITRES
CONC OF DYE ADDED	=	0.238E+07PPB
DYE / TANK VOLUME	=	65.38PPB

TEST RESULTS AND CALCULATED VALUES

DYE PEAK TIME	=	180.00MIN
PEAK/THEOR DET	=	0.600
PEAK/MEAN DYE RES	=	0.686MIN
MEAN DYE RESIDENCE	=	262.50MIN
PER DYE RECOVERY	=	114.304
FR. STAGNANT ZONE	=	0.125

CSTR S IN SERIES USING THEORETICAL RES.	=	2.50
CSTR S IN SERIES USING MEAN DYE RES.	=	3.18
D/UL VALUE USING THEORETICAL RESIDENCE	=	0.2244E+00
D/UL VALUE USING MEAN DYE RESIDENCE	=	0.1485E+00

TABLE D3 (Cont'd)

EXPERIMENTAL RESULTS C/CO VERSUS THETA

THETA	C/CO
0.075	0.014
0.150	0.115
0.225	0.315
0.300	0.572
0.375	0.772
0.450	0.901
0.525	0.973
0.600	1.016
0.675	1.002
0.750	0.973
0.825	0.916
0.900	0.844
0.975	0.801
1.050	0.730
1.125	0.658
1.200	0.601
1.275	0.529
1.350	0.473
1.425	0.430
1.500	0.372
1.575	0.329
1.650	0.286
1.725	0.257
1.800	0.214
1.875	0.187
1.950	0.165
2.025	0.136
2.100	0.115
2.175	0.099
2.250	0.086
2.500	0.057
2.750	0.029

TABLE D3 (Cont'd)

CALCULATED C/CO VERSUS THETA VALUES
FOR CSTR IN SERIES MODEL

THEORETICAL DETENTION		ACTUAL DETENTION	
THETA	C/CO	THETA	C/CO
0.000	0.000	0.000	0.000
0.050	0.181	0.050	0.029
0.100	0.327	0.100	0.100
0.150	0.444	0.150	0.194
0.200	0.536	0.200	0.296
0.250	0.607	0.250	0.399
0.300	0.659	0.300	0.494
0.350	0.695	0.350	0.579
0.400	0.719	0.400	0.651
0.450	0.732	0.450	0.709
0.500	0.736	0.500	0.753
0.550	0.732	0.550	0.784
0.600	0.723	0.600	0.803
0.650	0.709	0.650	0.811
0.700	0.690	0.700	0.810
0.750	0.669	0.750	0.800
0.800	0.646	0.800	0.784
0.850	0.621	0.850	0.762
0.900	0.595	0.900	0.735
0.950	0.568	0.950	0.705
1.000	0.541	1.000	0.672
1.200	0.435	1.200	0.531
1.400	0.341	1.400	0.397
1.600	0.261	1.600	0.284
1.800	0.197	1.800	0.198
2.000	0.147	2.000	0.134
2.200	0.108	2.200	0.089
2.400	0.079	2.400	0.058
2.600	0.057	2.600	0.037
2.800	0.041	2.800	0.024
3.000	0.030	3.000	0.015
3.200	0.021	3.200	0.009
3.400	0.015	3.400	0.006
3.600	0.011	3.600	0.004
3.800	0.008	3.800	0.002
4.000	0.005	4.000	0.001
4.200	0.004	4.200	0.001

TABLE D3 (Cont'd)

CALCULATED C/CO VERSUS THETA VALUES FOR DISPERSION MODEL

THEORETICAL DETENTION		ACTUAL DETENTION	
0.100	0.001	0.100	0.000
0.200	0.117	0.200	0.021
0.300	0.432	0.300	0.207
0.400	0.741	0.400	0.538
0.500	0.915	0.500	0.830
0.600	0.965	0.600	0.995
0.700	0.934	0.700	1.037
0.800	0.859	0.800	0.994
0.900	0.766	0.900	0.903
1.000	0.668	1.000	0.791
1.100	0.575	1.100	0.676
1.200	0.491	1.200	0.567
1.300	0.416	1.300	0.469
1.400	0.350	1.400	0.385
1.500	0.294	1.500	0.313
1.600	0.247	1.600	0.254
1.700	0.206	1.700	0.205
1.800	0.172	1.800	0.164
1.900	0.144	1.900	0.132
2.000	0.120	2.000	0.105
2.100	0.100	2.100	0.084
2.200	0.083	2.200	0.067
2.300	0.069	2.300	0.054
2.400	0.058	2.400	0.043
2.500	0.048	2.500	0.034
2.600	0.040	2.600	0.027
2.700	0.033	2.700	0.021
2.800	0.028	2.800	0.017
2.900	0.023	2.900	0.014
3.000	0.019	3.000	0.011

TABLE D4 TRACER RESPONSE ANALYSIS FOR FIRST STAGE OF TSS SLUDGE REACTOR (7/1/75)

TEST METHOD USING A PULSE INPUT OF RODAMINE WT DYE

REACTOR OPERATION AND TEST CONDITIONS

VOLUME OF REACTOR = 796.30LITRES
HYDRAULIC LOADING = 7.23LITRES/MIN
THEORETICAL DET = 109.38MIN
DYE INJECTION = 0.0600LITRES
CONC OF DYE ADDED = 0.238E+07PPB
DYE / TANK VOLUME = 179.33PPB

TEST RESULTS AND CALCULATED VALUES

DYE PEAK TIME = 0.75MIN
PEAK/THEOR DET = 0.007

PEAK/MEAN DYE RES = 0.011MIN
MEAN DYE RESIDENCE = 70.00MIN
PER DYE RECOVERY = 112.166
FR. STAGNANT ZONE = 0.360

CSTR S IN SERIES USING THEORETICAL RES. = 1.01
CSTR S IN SERIES USING MEAN DYE RES. = 1.01
D/UL VALUE USING THEORETICAL RESIDENCE = 0.1587E+03
D/UL VALUE USING MEAN DYE RESIDENCE = 0.8727E+02

TABLE D4 (Cont'd)

EXPERIMENTAL RESULTS C/CO VERSUS THETA

THETA	C/CO
0.137	1.053
0.274	0.905
0.411	0.792
0.549	0.687
0.686	0.589
0.823	0.507
0.960	0.429
1.097	0.370
1.234	0.317
1.371	0.269
1.508	0.236
1.646	0.209
1.783	0.175
1.920	0.148
2.057	0.128
2.194	0.108
2.331	0.093
2.468	0.080
2.606	0.071
2.743	0.061
2.880	0.053
3.017	0.046
3.154	0.040
3.291	0.035
3.428	0.030
3.565	0.025
3.703	0.022
3.840	0.018
3.977	0.017
4.114	0.013
4.571	0.008
5.028	0.004
5.485	0.003

TABLE D4 (Cont'd)

CALCULATED C/CO VERSUS THETA VALUES
FOR CSTR IN SERIES MODEL

THEORETICAL DETENTION		ACTUAL DETENTION	
THETA	C/CO	THETA	C/CO
0.000	[illegible]	0.000	[illegible]
0.050	0.951	0.050	0.951
0.100	0.905	0.100	0.905
0.150	0.861	0.150	0.861
0.200	0.819	0.200	0.819
0.250	0.779	0.250	0.779
0.300	0.741	0.300	0.741
0.350	0.705	0.350	0.705
0.400	0.670	0.400	0.670
0.450	0.638	0.450	0.638
0.500	0.607	0.500	0.607
0.550	0.577	0.550	0.577
0.600	0.549	0.600	0.549
0.650	0.522	0.650	0.522
0.700	0.497	0.700	0.497
0.750	0.472	0.750	0.472
0.800	0.449	0.800	0.449
0.850	0.427	0.850	0.427
0.900	0.407	0.900	0.407
0.950	0.387	0.950	0.387
1.000	0.368	1.000	0.368
1.200	0.301	1.200	0.301
1.400	0.247	1.400	0.247
1.600	0.202	1.600	0.202
1.800	0.165	1.800	0.165
2.000	0.135	2.000	0.135
2.200	0.111	2.200	0.111
2.400	0.091	2.400	0.091
2.600	0.074	2.600	0.074
2.800	0.061	2.800	0.061
3.000	0.050	3.000	0.050
3.200	0.041	3.200	0.041
3.400	0.033	3.400	0.033
3.600	0.027	3.600	0.027
3.800	0.022	3.800	0.022
4.000	0.018	4.000	0.018
4.200	0.015	4.200	0.015

TABLE D4 (Cont'd)

CALCULATED C/C0 VERSUS THETA VALUES FOR DISPERSION MODEL

THEORETICAL DETENTION			ACTUAL DETENTION	
0.100	0.907		0.100	0.908
0.200	0.820		0.200	0.822
0.300	0.742		0.300	0.743
0.400	0.671		0.400	0.672
0.500	0.607		0.500	0.608
0.600	0.550		0.600	0.550
0.700	0.497		0.700	0.498
0.800	0.450		0.800	0.450
0.900	0.407		0.900	0.407
1.000	0.368		1.000	0.369
1.100	0.333		1.100	0.333
1.200	0.301		1.200	0.302
1.300	0.273		1.300	0.273
1.400	0.247		1.400	0.247
1.500	0.223		1.500	0.223
1.600	0.202		1.600	0.202
1.700	0.183		1.700	0.183
1.800	0.165		1.800	0.165
1.900	0.150		1.900	0.150
2.000	0.135		2.000	0.135
2.100	0.122		2.100	0.122
2.200	0.111		2.200	0.111
2.300	0.100		2.300	0.100
2.400	0.091		2.400	0.091
2.500	0.082		2.500	0.082
2.600	0.074		2.600	0.074
2.700	0.067		2.700	0.067
2.800	0.061		2.800	0.061
2.900	0.055		2.900	0.055
3.000	0.050		3.000	0.050

TABLE D5 TRACER RESPONSE ANALYSIS COMPUTER PROGRAM

```
C     THE TWO CHIEF REFERENCES USED FOR THIS PROGRAMME ARE
C
C          1. LEVENSPIEL , CHEMICAL REACTION ENGINEERING , CHAPTER 9
C
C          2. TIMPANY , VARIATION IN AXIAL MIXING IN AN AERATION
C             TANK.  MASTERS THESIS, DEPT. OF CHEM ENG., MCMASTER
C             UNIVERSITY , 1966.
C
C     THE D/UL VALUE FOR THE DISPERSION MODEL IS SOLVED BY USING THE
C     CORRELATIONS OF PEAK TIME VERSUS D/UL DEVELOPED BY TIMPANY.(PP 31 - 32
C
C     THE CSTR IN SERIES MODEL IS SOLVED BY TAKING THE DERIVATIVE OF
C     EQUATION 9-35 IN LEVENSPIEL  -  EQUATING THE RESULT TO ZERO AND
C     SOLVING FOR THE NUMBER OF EQUAL TANKS IN SERIES, J , IN TERMS
C     OF THETA.THETA IS FOUND BY DIVIDING THE PEAK DYE TIME BY THE
C     THEORETICAL RESIDENCE TIME.
C
C     THE C/CO VALUES FOR THE DISPERSION MODEL ARE SOLVED BY ITERATION
C     USING EQUATION 8 IN CHAPTER 2 OF TIMPANY.
C
C     THE C/CO VALUES FOR THE CSTR IN SERIES MODEL ARE SOLVED USING
C     EQUATION 9-35 IN LEVENSPIEL FOR VARIOUS VALUES OF THETA.
C
C
      DIMENSION C(500),CUL(500),TANKS(5),AW(5),DULP(5),THETA(2,100)
      DIMENSION CCO(2,100),U(500),AMU(5,500),COCO(5,500),CCI(100)
      DIMENSION TTB(100),TBAR(2),RATIO(500),BETA(500),ETA(500)
      DIMENSION BLUE(100)
      DIMENSION CE(200)
C
C     VOLT=TANK VOLUME IN LITRES              VFLR=FLOW IN LITRES/MIN
C     TPEAK=PEAK TIME IN MINUTES              DYIN=AMOUNT OF DYE IN LITRES
C     DYCON=CONC OF DYE IN PPB                DT=MINUTES BETWEEN DATA PTS
C     N=NUMBER OF DATA PTS
C     C(I)=CONC OF DYE IN EFFLUENT PPB
C
      READ  1,VOLT,VFLR,TPEAK,DYIN,DYCON,DT
      PRINT 1,VOLT,VFLR,TPEAK,DYIN,DYCON,DT
      READ  2,N
      PRINT 2,N
      READ  3,(C(I),I=1,N)
      PRINT 3,(C(I),I=1,N)
C
C     PERCENT DYE RECOVERY
C
      AMT= C(1)*DT*VFLR*10.**(-6)
      CUL(1) = AMT
      DO 100 I=2,N
      AMT=.5*(C(I)+C(I-1))*DT*VFLR*10.**(-6)
      LUL = I-1
      CUL(I) = CUL(LUL)+AMT
  100 CONTINUE
```

```
      DYE = DYCON*DYIN*10.**(-6)
      PER = CUL(N)/DYE*100.
C
C     CALCULATION OF MEAN RESIDENCE TIME OF THE TOTAL DYE RETRIEVED
C     CALCULATION OF PERCENT STAGNANT ZONE
C
      TBAR(1) = VOLT/VELR
      ANT = 1.
      I = 1
      ZONE = CUL(N)/2.
  201 IF(CUL(I).GT.ZONE) GO TO 200
      ANT = ANT + 1.
      I = I +1
      GO TO 201
  200 TBAR(2) = ANT*DT
      DEAD = (TBAR(1)-TBAR(2))/TBAR(1)
C
C     CALCULATION NUMBER OF TANKS IN SERIES
C
      TP1 = TPEAK/TBAR(1)
      TP2 = TPEAK/TBAR(2)
      TANKS(1) = 1./(TP1*(1./TP1-1.))
      TANKS(2) = 1./(TP2*(1./TP2-1.))
C
C     TRUNCATE TO NEAREST WHOLE NUMBER OF TANKS
C
      AW(1) = TANKS(1)
      AA = 1.5
  203 IF(AW(1).LT.AA) GO TO 202
      AA = AA + 1.
      GO TO 203
  202 AW(1) = AA - .5
      AW(2) = TANKS(2)
      AA = 1.5
  205 IF(AW(2).LT.AA) GO TO 204
      AA = AA + 1.
      GO TO 205
  204 AW(2) = AA - .5
C
C     CALCULATION OF TIMPANY≠S PEAK TIME D/UL VAULES
C
      IF((TP1.GT.0.03).AND.(TP1.LT.0.3)) GO TO 206
      IF((TP1.GT.0.3).AND.(TP1.LT.0.8)) GO TO 207
      GO TO 208
  206 DULP(1)= .2*(TP1**(-1.34))
      GO TO 209
  207 DULP(1) = 4.027*(10.**(-2.09*TP1))
      GO TO 209
  208 PRINT 300
      IF(TP1.LE.0.03) GO TO 206
      GO TO 207
  209 CONTINUE
```

```
      IF((TP2.GT.0.03).AND.(TP2.LE.0.3)) GO TO 210
      IF((TP2.GT.0.3).AND.(TP2.LE.0.8)) GO TO 211
      GO TO 213
  210 DULP(2) = .2*(TP2**(-1.34))
      GO TO 214
  211 DULP(2) = 4.027*(10.**(-2.09*TP2))
      GO TO 214
  213 PRINT 300
      IF(TP2.LE.0.03) GO TO 210
      GO TO 211
  214 CONTINUE
C
C     CALCULATION OF  C/CO VS THETA VALUES FOR CSTR MODELS
C     DERIVATIVE AT PEAK DYE CONC METHOD USED
C
      DO 101 I=1,2
      X=AW(I)**AW(I)
      XX=1.
      BB=1.
  216 IF(AW(I).EQ.BB) GO TO 215
      XX=XX*(AW(I)-BB)
      BB=BB+1.
      GO TO 216
  215 FACT = XX
      THETA(I,1) =0.
      DO 102 J=2,21
      THETA(I,J) = THETA(I,J-1) + .05
  102 CCO(I,J)= X/XX*THETA(I,J)**(AW(I)-1.)*EXP(-AW(I)*THETA(I,J))
      DO 103 J= 22,37
      THETA(I,J) = THETA(I,J-1) + .2
  103 CCO(I,J)= X/XX*THETA(I,J)**(AW(I)-1.)*EXP(-AW(I)*THETA(I,J))
  101 CONTINUE
C
C     CLACULATION OF ACTUAL C/CO VALUES FROM EXPERIMENTAL DATA
C
      CNOT = DYIN*DYCON/VOLT
      MM = 0
      DRAG = 0.
      NN = 0
      DO 104 I = 1,30
      NN = NN + 3
      MM = MM + 1
      RATIO(MM) = C(NN)/CNOT
      DRAG = DRAG + 3*DT
      BETA(MM)= DRAG/TBAR(1)
  104 ETA(MM) = DRAG/TBAR(2)
      IM = (N- 90)/10 + 29
      DO 105 I = 31, IM
      MM = MM + 1
      DRAG = DRAG + 10.*DT
      NN = NN + 10
      RATIO(MM) = C(NN)/CNOT
```

```
      BETA(MM) = DRAG/TBAR(1)
      ETA(MM) = DRAG/CNOT
  105 CONTINUE
C
C     CALCULATION OF C/CO VALUES VS THETA FOR D/UL METHOD
C
C
      M = 1
   40 I=1
      AMU(M,I)=1.4
      U(M)=.5/DULP(M)
   45 AMU(M,I)=AMU(M,I)-.001
      FR= COS(AMU(M,I))/SIN(AMU(M,I))
      FR= FR - AMU(M,I)*DULP(M)+ .25/(AMU(M,I)*DULP(M))
      IF(FR)45,45,50
   50 AMU(M,I) = AMU(M,I) + .00001
      FR = COS(AMU(M,I))/SIN(AMU(M,I))
      FR= FR - AMU(M,I)*DULP(M) + .25/(AMU(M,I)*DULP(M))
      IF(FR)55,50,50
   55 AMU(M,I) = AMU(M,I) - .0000001
      FR = COS(AMU(M,I))/SIN(AMU(M,I))
      FR = FR - AMU(M,I)*DULP(M) + .25/(AMU(M,I)*DULP(M))
      IF(FR)55,55,60
   60 I= I + 1
      AMU(M,I) = AMU(M,I-1)+3.1417
      IF(I.LE.50) GO TO 45
      M = M + 1
      IF(M.LE.2) GO TO 40
      DO 80 M=1,2
  999 ZETA = 0.0
      DO 70 K=1,30
      ZETA = ZETA + .1
      COCO(M,K) = 0.0
      DO 65 I=1,50
      A=2.0*AMU(M,I)*(U(M)*SIN(AMU(M,I)) + AMU(M,I)*COS(AMU(M,I)))
      B=EXP(U(M)-((U(M)**2 + AMU(M,I)**2)/(2.0*U(M)))*ZETA)
      D=U(M)**2 + 2.0*U(M) + AMU(M,I)**2
  998 CE(I) = A*B/D
      COCO(M,K) = COCO(M,K) + CE(I)
   65 CONTINUE
   67 CONTINUE
   70 CONTINUE
   80 CONTINUE
C
C     PRINT INSTRUCTIONS AND DATA PRESENTATION FORMAT
C
      PRINT 700
  700 FORMAT(42X,24HTRACER RESPONSE ANALYSIS///)
      PRINT 701
  701 FORMAT(40X,29HROTATING BIOLOGICAL CONTACTOR)
      PRINT 702
  702 FORMAT(42X,26HHYDRAULIC CHARACTERIZATION///)
```

```
      PRINT 703
  703 FORMAT(30X,≠TEST METHOD USING A PULSE INPUT OF RODAMINE WT DYE≠,/)
      PRINT 704
  704 FORMAT(23X,37HREACTOR OPERATION AND TEST CONDITIONS///)
      PRINT 705,VOLT
  705 FORMAT(31X,20HVOLUME OF REACTOR = ,F7.2,6HLITRES)
      PRINT 706,VFLR
  706 FORMAT(31X,20HHYDRAULIC LOADING = ,F7.2,10HLITRES/MIN)
      PRINT 707,TBAR(1)
  707 FORMAT(31X,20HTHEORETICAL DET   = ,F7.2,3HMIN)
      PRINT 708,DYIN
  708 FORMAT(31X,20HDYE INJECTION     = ,F7.4,6HLITRES)
      PRINT 709,DYCON
  709 FORMAT(31X,20HCONC OF DYE ADDED = ,E10.3,3HPPB)
      PRINT 710,CNOT
  710 FORMAT(31X,20HDYE / TANK VOLUME = ,F7.2,3HPPB,////)
      PRINT 711
  711 FORMAT(23X,34HTEST RESULTS AND CALCULATED VALUES,////)
      PRINT 712,IPEAK
  712 FORMAT(31X,20HDYE PEAK TIME     = ,F7.2,3HMIN)
      PRINT 713,TP1
  713 FORMAT(31X,20HPEAK/THEOR DET    = ,F7.3/)
      PRINT 714,TP2
  714 FORMAT(31X,20HPEAK/MEAN DYE RES = ,F7.3,3HMIN)
      PRINT 715,TBAR(2)
  715 FORMAT(31X,≠MEAN DYE RESIDENCE =≠,F7.2,≠MIN≠)
      PRINT 716,PER
  716 FORMAT(31X,20HPER DYE RECOVERY  = ,F7.3,1H%)
      PRINT 717,DEAD
  717 FORMAT(31X,20HFR. STAGNANT ZONE = ,F7.3,/)
      PRINT 718,TANKS(1)
  718 FORMAT(31X,42HCSTR S IN SERIES USING THEOPETICAL RES. = ,F7.2)
      PRINT 719,TANKS(2)
  719 FORMAT(31X,42HCSTR S IN SERIES USING MEAN DYE RES.    = ,F7.2)
      PRINT 720,DULP(1)
  720 FORMAT(31X,42HD/UL VALUE USING THEORETICAL RESIDENCE  = ,E11.4)
      PRINT 721,DULP(2)
  721 FORMAT(31X,42HD/UL VALUE USING MEAN DYE RESIDENCE     = ,E11.4)
      PRINT 722
  722 FORMAT(31X,38HEXPERIMENTAL RESULTS C/CO VERSUS THETA,/////)
      PRINT 723
  723 FORMAT(14X,5HTHETA,15X,4HC/CO,///)
      PRINT 724,(BETA(I),RATIO(I),I=1,MM)
  724 FORMAT(15X,F5.3,15X,F5.3)
      PRINT 725
  725 FORMAT(31X,35HCALCULATED C/CO VERSUS THETA VALUES)
      PRINT 726
  726 FORMAT(37X,24HFOR CSTR IN SERIES MODEL,/////)
      PRINT 727
  727 FORMAT(12X,≠THEORETICAL DETENSION             ACTUAL DETENSION≠,//)
      PRINT 728
  728 FORMAT(15X,5HTHETA,6X,4HC/CO,15X,5HTHETA,6X,4HC/CO,///)
```

```
      PRINT 729,(THETA(1,J),CCO(1,J),THETA(2,J),CCO(2,J),J=1,37)
  729 FORMAT(15X,F5.3,6X,F5.3,15X,F5.3,6X,F5.3)
      PRINT 725
      PRINT 730
  730 FORMAT(26X,20HFOR DISPERSION MODEL,////)
      PRINT 727
      BLUE(1)= .1
      DO 731 K=2,30
      BLUE(K)= BLUE(K-1) + .1
  731 CONTINUE
      PRINT 729,(BLUE(K),COCO(1,K),BLUE(K),COCO(2,K),K=1,30)
    1 FORMAT(4F10.4,E10.2,F10.4)
    2 FORMAT(I10)
    3 FORMAT(5F10.2)
  300 FORMAT(10X,44HPEAK TIME OUTSIDE LIMIT FOR D/UL CALCULATION)
      STOP
      END
```

APPENDIX E

Effect of SRT and Temperature Variables on Nitrification

The complete factorial design at five levels of temperature and three levels of SRT (Table 10) allowed the effects of these factors on the output responses (filterable TKN removal and unit rate of filterable TKN removal) to be determined through an ANOVA (Tables E1 and E2). The factorial design, replicated once, allowed determination of the main effects of each variable and the two-factor interaction (Tables 11 and 12). SRT and temperature being quantitative factors, made it desirable to examine the relationship between the observed responses and the levels of each factor. The relationship between the response and the level of the factor can normally be approximated over a finite range of the factor by means of a polynomial. When the levels of the factor are at equal intervals the components of the polynomial linear, quadratic, etc., are all orthogonal to one another facilitating their determination. Calculating the components of the main effect of each factor (SRT and temperature), effectively gives the average shape of the curve relating the response to the level of the factor. It is possible for the shape of the curve describing the relationship between the response and one factor to change from one level of the other factor to another. This will be revealed by a detailed analysis of the two-factor interaction. For example, from Table E2 the interaction analysis for the combined sludge systems, SSC and TSC, reveals significant interactions of linear A (SRT) with linear B (Temperature) and quadratic B indicating the linear effect of A differs for different levels of B.

The methods and calculations involved in preparing the detailed ANOVA's are outlined in Design and Analysis of Industrial Experiments (1956).

Pseudo "Steady-State" Reparameterised Arrhenius Models

The analysis of variance results for the reparameterised Arrhenius models, describing the unit rate of filterable TKN removal and the filterable TKN removal as functions of temperature (Figures 13, 14, 15, 17, 18, and 19), were established from the use of a non-linear least squares routine. An example of the use of the computer program including the output results appears in Table E6. The sum of squares after regression

TABLE E1 DETAILED EFFECTS OF SYSTEM SRT AND TEMPERATURE ON FILTERABLE TKN REMOVAL IN SEPARATE AND COMBINED SLUDGE SYSTEMS

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Square (MS)	Variance Ratio (MS/MSPE)	F α=.95
Main Effects					
SRT(A):					
TSS	935.64	2	467.82	14.49	3.68
Components - Linear	907.21	1	907.21	28.10	4.54
- Quadratic	28.43	1	28.43	0.88	4.54
SSC or TSC	886.20	2	443.10	15.10	3.68
Components - Linear	869.88	1	869.88	29.65	4.54
- Quadratic	16.32	1	16.32	0.56	4.54
Temperature (B):					
TSS	7339.02	4	1834.75	56.84	3.06
Components - Linear	7078.55	1	7078.55	219.29	4.54
- Quadratic	142.88	1	142.88	5.43	4.54
- Cubic	83.08	1	83.08	2.57	4.54
- Quartic	34.51	1	34.51	1.07	4.54
SSC or TSC	10091.20	4	2552.80	85.96	3.06
Components - Linear	9370.00	1	9370.00	319.36	4.54
- Quadratic	527.00	1	527.20	17.96	4.54
- Cubic	153.28	1	153.28	5.22	4.54
- Quartic	46.92	1	40.92	1.40	4.54
SRT-Temperature Interactions:					
TSS	364.97	8	45.62	1.41	2.64
Components - Linear A x Linear B	44.95	1	44.95	1.39	4.54
- Linear A x Quadratic B	208.29	1	208.29	6.45	4.54
- Quadratic A x Linear B	1.05	1	1.05	0.03	4.54
- Quadratic A x Quadratic B	18.40	1	18.40	0.57	4.54
- *Remainder	92.28	4	23.04	0.71	3.06
SSC or TSC	442.01	8	55.25	1.88	2.64
Components - Linear A x Linear B	110.89	1	110.89	3.77	4.54
- Linear A x Quadratic B	189.44	1	189.44	6.46	4.54
- Quadratic A x Linear B	6.26	1	6.26	0.21	4.54
- Quadratic A x Quadratic B	63.15	1	63.15	2.15	4.54
- *Remainder	72.27	4	72.27	0.62	3.06
Pure Error (PE):					
TSS	484.23	15	32.28	-	-
SSC or TSC	440.15	15	29.34	-	-

Note: *Remainder = Cubic B x Linear A
Cubic B x Quadratic A
Quartic B x Linear A
Quartic B x Quadratic A

TABLE E2 DETAILED EFFECTS OF SYSTEM SRT AND TEMPERATURE ON UNIT RATE OF FILTERABLE TKN REMOVAL IN SEPARATE AND COMBINED SLUDGE SYSTEMS

Source of Variation	*Sum of Squares	Degrees of Freedom	*Mean Square (MS)	Variance Ratio (MS/MSPE)	F α=.95
Main Effects					
SRT(A):					
TSS	2.64	2	1.32	2.75	3.68
Components - Linear	0.24	1	0.24	0.50	4.54
- Quadratic	2.40	1	2.40	5.00	4.54
SSC or TSC	1.56	2	0.78	13.00	3.68
Components - Linear	0.74	1	0.74	12.30	4.54
- Quadratic	0.82	1	0.82	13.70	4.54
Temperature (B):					
TSS	125.98	4	31.50	65.61	3.06
Components - Linear	103.65	1	103.65	215.90	4.54
- Quadratic	17.17	1	17.17	35.77	4.54
- Cubic	4.54	1	4.54	9.46	4.54
- Quartic	0.62	1	0.62	1.29	4.54
SSC or TSC	18.84	4	4.71	78.50	3.06
Components - Linear	16.80	1	16.80	280.00	4.54
- Quadratic	1.55	1	1.55	25.83	4.54
- Cubic	0.46	1	0.46	7.67	4.54
- Quartic	0.03	1	0.03	0.50	4.54
SRT-Temperature Interactions:					
TSS	13.50	8	1.69	3.52	2.64
Components - Linear A x Linear B	3.95	1	3.95	8.27	4.54
- Linear A x Quadratic B	2.30	1	2.30	4.94	4.54
- Quadratic A x Linear B	3.15	1	3.15	6.58	4.54
- Quadratic A x Quadratic B	1.81	1	1.81	3.77	4.54
-**Remainder	2.19	4	0.55	1.15	3.06
SSC or TSC	4.82	8	0.60	10.04	2.64
Components - Linear A x Linear B	2.05	1	2.05	34.17	4.54
- Linear A x Quadratic B	0.59	1	0.59	9.83	4.54
- Quadratic A x Linear B	1.18	1	1.18	19.67	4.54
- Quadratic A x Quadratic B	0.46	1	0.46	7.67	4.54
- **Remainder	0.54	4	0.14	2.33	3.06
Pure Error (PE):					
TSS	7.18	15	0.48	-	-
SSC or TSC	0.86	15	0.06	-	-

Note: *values x 10^3

** Remainder = Cubic B x Linear A
Cubic B x Quadratic A
Quartie B x Linear A
Quartic B x Quadratic A

result was used in preparation of Table E3. The pure error sum of squares was determined from repeats (Himmelblau, 1970). In determining ANOVA results for the pooled models (Table E4 and E5) the pure error was estimated by a pooled sum of squares based on individual pure error values and related degrees of freedom.

TABLE E3 ANOVA FOR REPARAMETERIZED ARRHENIUS MODEL FOR COMBINED SLUDGE UNIT RATE RESULTS 10 DAY SRT

Source of Variation	*Sum of Squares (SS)	Degrees of Freedom	*Mean Square (MS)	$\frac{MSLOF}{MSPE}$	F $\alpha = .95$
(Reparameterized Model: $K = 0.0308 \cdot e^{-12450/R\left(\frac{1}{T} - \frac{1}{T_0}\right)}$)					
After Regression	0.397	9	0.044		
Pure Error (PE)	0.293	5	0.059		
Lack of Fit (LOF)	0.104	4	0.026		
				0.45	5.19

Note: * values x 10^3

TABLE E4 ANOVA FOR REPARAMETERIZED ARRHENIUS MODEL FOR COMBINED SLUDGE UNIT RATE RESULTS 4, 7, AND 10 DAY SRT WITH K/K*

Source of Variation	Sum of Squares (SS)	Degrees of Freedom	Mean Square (MS)	$\frac{MSLOF}{MSPE}$	F $\alpha = .95$	F $\alpha = .99$
(Reparameterized Model: $K/K^* \doteq e^{-17600/R\left(\frac{1}{T} - \frac{1}{T_0}\right)}$)						
After Regression	11.639	53	0.220			
Pure Error (PE)	0.544	32	0.017			
Lack of Fit (LOF)	11.095	21	0.528			
				31.08	1.9	2.5

TABLE E5 ANOVA FOR REPARAMATERIZED ARRHENIUS MODEL FOR COMBINED SLUDGE FILTERABLE TKN REMOVAL RESULTS 4, 7, AND 10 DAY SRT WITH K/K*

Source of Variation	Sum of Squares (SS)	Degrees of Freedom	Mean Square (MS)	$\frac{MSLOF}{MSPE}$	F α=.95	F α=.99
(Reparameterized Model: $K/K^* = e^{-15400/R\,(\frac{1}{T} - \frac{1}{T_0})}$)						
After Regression	2.865	53	0.054			
Pure Error (PE)	0.342	32	0.011			
Lack of Fit (LOF)	2.523	21	0.120			
				10.92	1.9	2.5

```
      PROGRAM SUTTON
      DIMENSION X(26),Y(26),SCRAT(300)
      DIMENSION TH(2), SIGNS(2), DIFF(2)
      COMMON X
      EXTERNAL MODEL
    3 READ 4,NOB,TH(1),TH(2),JS
      IF(IFEOF(60).EQ.-1) STOP
    4 FORMAT(I3,F10.3,F10.3,I3)
      DO 10 I=1,NOB
      READ 1000,X(I),Y(I)
 1000 FORMAT(7X,F7.5,F7.4)
   10 PRINT 1000, X(I), Y(I)
      PRINT 4,(NOB,TH(1),TH(2))
      PRINT 6,JS
    6 FORMAT(20X,14HPROBLEM NUMBER, I3)
      SIGNS(1)=1
      SIGNS(2)=1
      DIFF(1)=.01
      DIFF(2)=.01
      EPS1=1.0E-7
      EPS2=1.0E-7
      CALL UWHAUS(1,MODEL,NOB,Y,2,TH,DIFF,SIGNS,EPS1,EPS2,
     610,.01,10.,SCRAT)
      GO TO 3
      END

      SUBROUTINE MODEL (NPROB,TH,F,NOB,NP)
      COMMON X
      DIMENSION TH(1),F(1),X(26)
      DO 10 I=1,NOB
   10 F(I)=TH(2)*EXP(TH(1)*X(I))
      RETURN
      END

      SUBROUTINE UWHAUS(NPROB,MODEL,NOB,Y,NP,TH,DIFF,SIGNS,EPS1,EPS2,
     1  MIT, FLAM, FNU, SCRAT)
      DIMENSION SCRAT(1)
      IA=1
      IB=IA+NP
      IC=IB+NP
      ID=IC+NP
      IE=ID+NP
      IF=IE+NP
      IG=IF+NOB
      IH=IG+NOB
      II = IH + NP * NOB
      IJ = IH
        CALL  HAUS59(NPROB,MODEL,NOB,Y,NP,TH,DIFF,SIGNS,EPS1,EPS2,MIT
     1  ,FLAM,FNU,SCRAT(IA), SCRAT(IB), SCRAT(IC), SCRAT(ID),
     2  SCRAT(IE), SCRAT(IF), SCRAT(IG), SCRAT(IH), SCRAT(II),
     3  SCRAT(IJ)   )
      RETURN
      END
```

```
      SUBROUTINE HAUS59(NPRBO, MODEL, NBO, Y,NQ,TH,DIFZ,SIGNS,EP1S,-P%,
     1MIT,FLAM,FNU,    Q,P,E,PHI,TB,F,R,A,D,DELZ)
C                    FORTRAN II VERSION
C                    H. J. WERTZ
C     ADAPTED FOR THE CDC 6400  (J. F. MACGREGOR)
C
C     DIMENSION TH(NQ), DIFZ(NQ), SIGNS(NQ), Y(NBO)
C     DIMENSION Q(NQ), P(NQ), E(NQ), PHI(NQ), TB(NQ)
C     DIMENSION F(NBO), R(NBO)
C     DIMENSION A(NQ,NQ), D(NQ,NQ), DELZ(NBO,NQ)
      DIMENSION TH(1), DIFZ(1), SIGNS(1), Y(1), Q(1), P(1), E(1),
     1   PHI(1), TB(1), F(1), R(1), A(1), D(1), DELZ(1)
      ACOS(X) = ATAN(SQRT(1.0/X**2 - 1.0))
      NP = NQ
      NPROB = NPRBO
      NOB = NBO
      EPS1 = EP1S
      EPS2 = EP2S
      NPSQ = NP * NP
       NSCRAC = 5*NP+NPSQ +2*NOB+NP*NOB
       PRINT 1000, NPROB, NOB, NP, NSCRAC
      PRINT 1001
       CALL GASS60(1, NP, TH, TEMP, TMEP)
      PRINT 1002
       CALL GASS60(1, NP, DIFZ, TEMP, TEMP)
      IF(MINO(NP-1,50-NP,NOB-NP,MIT-1,999-MIT))99,15,15
   15 IF(FNU-1.0)99, 99, 16
   16 CONTINUE
      DO 19 I=1,NP
      TEMP = ABS(DIFZ(I))
      IF(AMIN1(1.0-TEMP, ABS(TH(I))))99, 99, 19
   19 CONTINUE
      GA = FLAM
      NIT = 1
      LAOS = 0
      IF(EPS1) 5,70,70
    5 EPS1 = 0
   70 SSQ = 0
      CALL MODEL(NPROB, TH, F, NOB, NP)
      DO 90 I = 1, NOB
      R(I) = Y(I) - F(I)
   90 SSQ=SSQ+R(I)*R(I)
      PRINT 1003, SSQ
C
C                                                  BEGIN ITERATION
C
  100 GA = GA / FNU
      INTCNT = 0
      PRINT 1004, NIT
  101 JS = 1 - NOB
      DO 130 J=1,NP
      TEMP = TH(J)
```

```
      P(J)=DIFZ(J)*TH(J)
      TH(J)= TH(J)+P(J)
      Q(J)=C
      JS = JS + NOB
      CALL MODEL(NPROB, TH, DELZ(JS), NOB, NP1
      IJ = JS-1
      DO 120 I = 1, NOB
      IJ = IJ + 1
      DELZ(IJ) = DELZ(IJ) - F(I)
  120 Q(J) = Q(J) + DELZ(IJ) * P(I)
      Q(J)= Q(J)/P(J)
C                                          Q=XT*R (STEEPEST DESCENT)
  130 TH(J) = TEMP
      IF(LAOS) 131,131,414
  131 DO 150 I = 1, NP
      DO 151 J=1,I
      SUM = 0
      KJ = NOB*(J-1)
      KI = NOB*(I-1)
      DO 160 K = 1, NOB
      KI = KI + 1
      KJ = KJ + 1
  160 SUM = SUM + DELZ(KI) * DELZ(KJ)
      TEMP= SUM/(P(I)*P(J))
      JI = J + NP*(I-1)
      D(JI) = TEMP
      IJ = I + NP*(J-1)
  151 D(IJ) = TEMP
  150 E(I) = SQRT(D(JI))
  666 CONTINUE
      DO 153  I = 1, NP
      IJ = I-NP
      DO 153 J=1,I
      IJ = IJ + NP
      A(IJ) = D(IJ) / (E(I)*E(J))
      JI = J + NP*(I-1)
  153 A(JI) = A(IJ)
C                                          A= SCALED MOMENT MATRIX
      II = - NP
      DO 155 I=1,NP
      P(I)=Q(I)/E(I)
      PHI(I)=P(I)
      II = NP + 1 + II
  155 A(II) = A(II) + GA
C
      I=1
       CALL MATIN(A, NP, P, I, DET)
C                                          P/E = CORRECTION VECTOR
       STEP=1.0
      SUM1=0.
      SUM2=0.
      SUM3=0.
```

```
       SUBROUTINE GASS60(ITYPE, NQ, A, B, C)
      DIMENSION A(NQ),B(NQ),C(NQ,NQ)
       NP = NQ
       NR = NP/10
       LOW = 1
       LUP = 10
10    IF( NR )15,20,30
15    RETURN
20    LUP=NP
      IF(LOW .GT. LUP) RETURN
30    PRINT 500, (J,J=LOW,LUP)
      GO TO (40,60,80),ITYPE
40    PRINT 600,(A(J),J=LOW,LUP)
      GO TO 100
60    PRINT 600, (B(J),J=LOW,LUP)
      GO TO 40
80    DO 90 I=LOW,LUP
90    PRINT 720,I,(C(J,I),J=LOW,I)
      LOW2=LUP+1
      IF(LOW2 .GT. NP) GO TO 100
      DO 95 I=LOW2,NP
95    PRINT 720,I,(C(J,I),J=LOW,LUP)
100    LOW = LOW + 10
       LUP = LUP + 10
       NR = NR - 1
       GO TO 10
500   FORMAT(/I8,9I12)
600   FORMAT(10E12.4)
720   FORMAT(1H0,I3,1X,F7.4,9F12.4)
1     CONTINUE
      RETURN
      END
```

NON-LINEAR ESTIMATION, PROBLEM NUMBER : COMBINED SLUDGE SSRT = 10 DAYS

11 OBSERVATIONS, 2 PARAMETERS 58 SCRATCH REQUIRED

INITIAL PARAMETER VALUES

1	2
-0.7000E+04	0.7000E-02

PROPORTIONS USED IN CALCULATING DIFFERENCE QUOTIENTS

1	2
0.1000E-01	0.1000E-01

INITIAL SUM OF SQUARES = 0.3774E-02

ITERATION NO. 1

DETERMINANT = 0.3935E+00 ANGLE IN SCALED COORD. =41.57DEGREES

TEST POINT PARAMETER VALUES
-0.3981E+04 0.3069E-01

TEST POINT SUM OF SQUARES = 0.1014E-02

PARAMETER VALUES VIA REGRESSION

1	2
-0.3981E+04	0.3069E-01

LAMBDA = 0.100E-02 SUM OF SQUARES
AFTER REGRESSION = 0.1013855 E-02

ITERATION NO. 2

DETERMINANT = 0.7160E+00 ANGLE IN SCALED COORD. =25.33DEGREES

TEST POINT PARAMETER VALUES
-0.6333E+04 0.3133E-01

TEST POINT SUM OF SQUARES = 0.4066E-03

PARAMETER VALUES VIA REGRESSION

1	2
-0.6333E+04	0.3133E-01

LAMBDA = 0.100E-03 SUM OF SQUARES
AFTER REGRESSION = 0.4065500E-03

TABLE E6 (Cont'd)

ITERATION NO. 3

DETERMINANT = 0.4524E+00 ANGLE IN SCALED COORD. =13.83DEGREES

TEST POINT PARAMETER VALUES
-0.6258E+04 0.3076E-01

TEST POINT SUM OF SQUARES = 0.3965E-03

PARAMETER VALUES VIA REGRESSION

1	2
-0.6258E+04	0.3076E-01

LAMBDA = 0.100E-04 SUM OF SQUARES AFTER REGRESSION = 0.3968095 E-03

ITERATION NO. 4

DETERMINANT = 0.4596E+00 ANGLE IN SCALED COORD. =45.39DEGREES

TEST POINT PARAMETER VALUES
-0.6254E+04 0.3076E-01

TEST POINT SUM OF SQUARES = 0.3968E-03

PARAMETER VALUES VIA REGRESSION

1	2
-0.6254E+04	0.3076E-01

LAMBDA = 0.100E-05 SUM OF SQUARES AFTER REGRESSION = 0.3968077 E-03

ITERATION NO. 5

DETERMINANT = 0.4600E+00 ANGLE IN SCALED COORD. =43.27DEGREES

TEST POINT PARAMETER VALUES
-0.6254E+04 0.3076E-01

TEST POINT SUM OF SQUARES = 0.3968E-03

PARAMETER VALUES VIA REGRESSION

1	2
-0.6254E+04	0.3076E-01

LAMBDA = 0.100E-06 SUM OF SQUARES AFTER REGRESSION = 0.3968077E-03

FINAL FUNCTION VALUES

0.4477E-01	0.2114E-01	0.3076E-01	0.6516E-01	0.1364E-01	0.1364E-01
0.2114 E-01	0.2395 E-01	0.3076E-01	0.4477 E-01	0.6516E-01	

RESIDUALS

-0.1367E-01	0.1063E-02	0.3038E-02	0.5942E-02	0.7570E-03	-0.2143E-02
-0.9371 E-03	0.8446E-02	-0.5662E-02	0.6829 E-02	-0.9371 E-03	

CORRELATION MATRIX

	1	2
1	1.0000	
2	0.7348	1.0000

NORMALIZING ELEMENTS

1	2
0.1212E+06	0.3560E+00

VARIANCE OF RESIDUALS = 0.4409E-04, 9 DEGREES OF FREEDOM

INDIVIDUAL CONFIDENCE LIMITS FOR EACH PARAMETER (ON LINEAR HYPOTHESIS)

1	2
-0.4645E+04	0.3549E-01
-0.7864E+04	0.2603E-01

1

APPROXIMATE CONFIDENCE LIMITS FOR EACH FUNCTION VALUE

0.4949E-01	0.2608E-01	0.3549E-01	0.7376E-01	0.1825E-01	0.1825E-01
0.4005E-01	0.1619E-01	0.2603E-01	0.5656E-01	0.9035E-02	0.9035E-02

3 4

0.2608 E-01	0.2888E-01	0.3549E-01	0.4949E-01	0.7376E-01
0.1619 E-01	0.1903E-01	0.2603E-01	0.4005E-01	0.5056E-01

```
      IF(NIT - MIT) 100, 100, 280
 2700 PRINT 2710
 2710 FORMAT(//115H0**** THE SUM OF SQUARES CANNOT BE REDUCED TO THE SUM
     1OF SQUARES AT THE END OF THE LAST ITERATION - ITERATING STOPS    /)
C
C                                                        END ITERATION
C
 280  PRINT 1011
      PRINT 2001, (F(I), I = 1, NOB)
      PRINT 1012
      PRINT 2001, (R(I), I = 1, NOB)
      SSQ=SUMB
      IDF=NOB-NP
      PRINT 1015
      I=0
       CALL MATIN(D, NP, P, I, DET)
      DO 7692 I=1,NP
      II = I + NP*(I-1)
 7692 E(I) = SQRT(D(II))
      DO 340 I=1,NP
      JI = I + NP*(I-1) - 1
      IJ = I + NP*(I-2)
      DO 340 J = I, NP
      JI = JI + 1
      A(JI) = D(JI) / (E(I)*E(J))
      IJ = IJ + NP
 340   A(IJ) = A(JI)
       CALL GASS60(3, NP, TEMP, TEMP, A)
      PRINT 1016
       CALL GASS60(1, NP, E, TEMP, TEMP)
      IF(IDF) 341, 410, 341
 341  SDEV = SSQ / IDF
      PRINT 1014, SDEV, IDF
       SDEV = SQRT(SDEV)
      DO 391 I=1,NP
      P(I)=TH(I)+2.0*E(I)*SDEV
 391  TB(I)=TH(I)-2.0*E(I)*SDEV
      PRINT 1039
       CALL GASS60(2, NP, TB, P, TEMP)
      LAOS = 1
      GO TO 101
 414  DO 415 K = 1, NOB
      TEMP = 0
      DO 420 I=1,NP
      DO 420 J=1,NP
      ISUB = K+NOB*(I-1)
      DEBUG1 = DELZ(ISUB)
C     DEBUG1 = DELZ(K + NOB*(I-1))
      ISUB = K+NOB*(J-1)
      DEBUG2 = DELZ(ISUB)
C     DEBUG2 = DELZ(K + NOB*(J-1))
      IJ = I + NP*(J-1)
```

```
      DO 231 I=1,NP
      SUM1=P(I)*PHI(I)+SUM1
      SUM2=P(I)*P(I)+SUM2
      SUM3= PHI(I) * PHI(I) + SUM3
  231 PHI(I) = P(I)
       TEMP = SUM1/SQRT(SUM2*SUM3)
      TEMP = AMIN1(TEMP, 1.0)
      TEMP = 57.295*ACOS(TEMP)
      PRINT 1041, DET, TEMP
  170 DO 220 I = 1, NP
      P(I) = PHI(I) *STEP / E(I)
      TB(I) = TH(I) + P(I)
  220 CONTINUE
      PRINT 7000
 7000 FORMAT(30H0TEST POINT PARAMETER VALUES      )
      PRINT 2006, (TB(I), I = 1, NP)
      DO 221 I = 1, NP
      IF(SIGNS(I)) 221, 221, 222
  222 IF(SIGN(1.0,TH(I))*SIGN(1.0,TB(I))) 663, 221, 221
  221 CONTINUE
      SUMB=0
      CALL MODEL(NPROB, TB, F, NOB, NP)
      DO 230 I=1,NOB
      R(I)=Y(I)-F(I)
  230 SUMB=SUMB+R(I)*R(I)
      PRINT 1043, SUMB
      IF(SUMB - (1.0+EPS1)*SSQ) 662, 662, 663
  663 IF( AMIN1(TEMP-30.0, GA)) 665, 665, 664
  665 STEP=STEP/2.0
      INTCNT = INTCNT + 1
      IF(INTCNT - 36) 170, 2700, 2700
  664 GA=GA*FNU
      INTCNT = INTCNT + 1
      IF(INTCNT - 36) 666, 2700, 2700
  662 PRINT 1007
      DO 669 I=1,NP
  669 TH(I)=TB(I)
       CALL GASS60(1, NP, TH, TEMP, TEMP)
      PRINT 1040, GA, SUMB
      IF(EPS2) 229,229,225
  229 IF(EPS1) 270,270,265
  225 DO 240 I = 1, NP
      IF(ABS(P(I))/(1.E-20+ABS(TH(I)))-EPS2) 240, 240, 241
  241 IF(EPS1) 270,270,265
  240 CONTINUE
      PRINT 1009, EPS2
      GO TO 280
  265 IF(ABS(SUMB - SSQ) - EPS1*SSQ) 266, 266, 270
  266 PRINT 1010, EPS1
      GO TO 280
  270 SSQ=SUMB
      NIT=NIT+1
```

```
      DEBUG3 = D(IJ)/(DIFZ(I)*TH(I)*DIFZ(J)*TH(J))
420   TEMP = TEMP + DEBUG1 * DEBUG2 * DEBUG3
       TEMP = 2.0*SQRT(TEMP)*SDEV
      R(K)=F(K)+TEMP
415   F(K)=F(K)-TEMP
      PRINT 1008
      IE=0
      DO 425 I=1,NOB,10
      IE=IE+10
      IF(NOB-IE) 430,435,435
 430  IE=NOB
435   PRINT 2001, (R(J), J = I, IE)
425   PRINT 2006, (F(J), J = I, IE)
410   PRINT 1033, NPROB
      RETURN
99    PRINT 1034
      GO TO 410
10000FORMAT(38H1NON-LINEAR ESTIMATION, PROBLEM NUMBER   I3,// I5,
    1 14H OBSERVATIONS, I5, 11H PARAMETERS  I14, 17H SCRATCH REQUIRED)
1001 FORMAT(/25H0INITIAL PARAMETER VALUES  )
1002 FORMAT(/54H0PROPORTIONS USED IN CALCULATING DIFFERENCE QUOTIENTS )
1003 FORMAT(/25H0INITIAL SUM OF SQUARES =   E12.4)
1004 FORMAT(/////45X,13HITERATION NO.  I4)
1007 FORMAT(/32H0PARAMETER VALUES VIA REGRESSION  )
1008 FORMAT(////54H0APPROXIMATE CONFIDENCE LIMITS FOR EACH FUNCTION VAL
    1UE    )
10090FORMAT(/62H0ITERATION STOPS - RELATIVE CHANGE IN EACH PARAMETER LE
    1SS THAN   E12.4)
10100FORMAT(/62H0ITERATION STOPS - RELATIVE CHANGE IN SUM OF SQUARES LE
    1SS THAN   E12.4)
1011 FORMAT(22H1FINAL FUNCTION VALUES  )
1012 FORMAT(////10H0RESIDUALS  )
1014 FORMAT(//24H0VARIANCE OF RESIDUALS =    ,E12.4,1H,I4,
    120H DEGREES OF FREEDOM   )
1015 FORMAT(////19H0CORRELATION MATRIX   )
1016 FORMAT(////21H0NORMALIZING ELEMENTS   )
1033 FORMAT(//19H0END OF PROBLEM NO.  I3)
1034 FORMAT(/16H0PARAMETER ERROR  )
10390FORMAT(/71H0INDIVIDUAL CONFIDENCE LIMITS FOR EACH PARAMETER (ON LI
    1NEAR HYPOTHESIS)   )
10400FORMAT(/9H0LAMBDA =E10.3,40X,33HSUM OF SQUARES AFTER REGRESSION =
    1E15.7)
1041 FORMAT(14H DETERMINANT =  E12.4, 6X, 25H ANGLE IN SCALED COORD. =
    1  F5.2, 8HDEGREES   )
1043 FORMAT(28H0TEST POINT SUM OF SQUARES =    E12.4)
2001 FORMAT(/10E12.4)
2006 FORMAT(10E12.4)
      END
```

```
      SUBROUTINE MATIN(A, NVAR, B, NB, DET)
      DIMENSION A(NVAR, 1), B(NVAR, 1)
      COMMON/GASPAR/DUMIES(7), PIVOTM
       PIVOTM = A(1,1)
       DET = 1.0
      DO 550 ICOL = 1, NVAR
       PIVOT = A(ICOL, ICOL)
      PIVOTM = AMIN1(PIVOT, PIVOTM)
       DET = PIVOT * DET
C
C     DIVIDE PIVOT ROW BY PIVOT ELEMENT
C
       A(ICOL, ICOL) = 1.0

      PIVOT = AMAX1(PIVOT, 1.E-20)
       PIVOT = A(ICOL, ICOL)/PIVOT
      DO 350 L=1,NVAR
 350   A(ICOL, L) = A(ICOL, L)*PIVOT
      IF(NB .EQ. 0) GO TO 371
      DO 370 L=1,NB
 370   B(ICOL, L) = B(ICOL, L)*PIVOT
C
C     REDUCE NON-PIVOT ROWS
C
 371  DO 550 L1=1,NVAR
       IF(L1 .EQ. ICOL) GO TO 550
       T = A(L1, ICOL)
       A(L1, ICOL) = 0.
      DO 450 L=1,NVAR
 450   A(L1, L) = A(L1, L) - A(ICOL, L)*T
      IF(NB .EQ. 0) GO TO 550
      DO 500 L=1,NB
 500   B(L1, L) = B(L1, L)-B(ICOL,L)*T
  550 CONTINUE
      RETURN
      END
```

APPENDIX F

Development of Transfer Function-Noise Models

A number of transfer function-noise models (TF-N) describing the effluent filterable TKN and NO_3^--N from the combined and separate sludge systems (Tables F1 and F2) were developed according to the iterative procedure described previously using the results from experiment D5. The computer programs involved in the development of model number C1 (Table F1) including calculation of the cross correlations and impulse response weights (Table F4), estimation of the parameters of the tentatively identified transfer function model (Table F5), and the re-estimating of the parameters of the combined TF-N model (Table F6) are presented as examples. In determining the most appropriate models to represent the results the methods included statistical comparison techniques and individual evaluation through diagnostic checking.

The comparison techniques involved extra sums of squares testing (Draper and Smith, 1968) in which more elaborate models containing a greater number of parameters were compared to simpler forms and the significance of the extra parameters assessed. Individual diagnostic evaluation involved assessment of the autocorrelation function of the residuals and cross correlations between the residuals and the input variables. Assuming the form of the TF-N model was correct and that the true parameter values are known, then the estimated autocorrelation function of the residuals would be uncorrelated and distributed normally about zero with variance n^{-1}, where n is the number of data points in the series. A further assessment of the residuals involves taking the first k autocorrelations and computing the Q statistic (Table F3). Comparing the result to the chi-square distribution (χ^2) with k-p-q degrees of freedom, where p+q is the total number of parameters of the noise model, determines the significance of the residuals. In a similar manner the significance of the cross correlations between the residuals and the stationary input series for each variable can be computed by comparing the S statistic to the χ^2 distribution (Table F3)

TABLE F1 TRANSFER FUNCTION - NOISE MODELS FOR COMBINED SLUDGE SYSTEM

Output Variable	Model No.	Model	Residuals Sum of Squares	Residuals Degrees of Freedom	Residuals Mean Square
Filterable TKN	C_1	$Y_t = \frac{0.011 \pm 0.004}{1-0.786 \pm 0.106\beta} X1_{t-1}$	292.4	116	2.52
		$+ \frac{1}{1-1.066 \pm 0.177\beta + 0.336 \pm 0.175\beta^2} a_t$			
	C_2	$Y_t = \frac{0.012 \pm 0.004}{1-0.731 \pm 0.131\beta} X1_{t-1}$	327.4	117	2.80
		$+ \frac{1}{1-0.796 \pm 0.111\beta} a_t$			
	C_3	$Y_t = (0.151 \pm 0.065 + 0.148 \pm 0.065\beta)\ X2_{t-1}$	308.5	116	2.67
		$+ 1.395 \pm 0.957\ X4_{t-2}$			
		$+ \frac{1}{1-0.857 \pm 0.091} a_t$			
NO_3^--N	C_4	$Y_t = 0.051 \pm 0.075\ X2_{t-3}$	383.0	116	3.30
		$- \frac{0.003 \pm 0.002}{1-0.744 \pm 0.310\beta} X3_{t-3}$			
		$+ \frac{1}{1-0.889 \pm 0.083\beta} a_t$			
	C_5	$Y_t = \frac{0.052 \pm 0.076}{1 + 0.115 \pm 1.05\beta} X2_{t-3}$	382.9	115	3.33

TABLE F1 (Cont'd)

Output Variable	Model No.	Model	Residuals Sum of Squares	Residuals Degrees of Freedom	Residuals Mean Square
		$- \frac{0.003 \pm 0.002}{1-0.737 \pm 0.319B} X3_{t-3}$			
		$+ \frac{1}{1-0.889 \pm 0.083B} a_t$			
	C6	$Y_t = \frac{-0.0036 \pm 0.0022}{1-0.650 \pm 0.268B} X3_{t-3}$	396.03	117	3.39
		$+ \frac{1}{1-0.883 \pm 0.082B} a_t$			

Where X_1 = TKN (filterable) loading (g/day),
X_2 = Influent TKN (filterable) concentration (mg/l), and
X_3 = OC (filterable) loading.

TABLE F2 TRANSFER FUNCTION - NOISE MODELS FOR SEPARATE SLUDGE SYSTEM

Output Variable	Model No.	Model	Residuals Sum of Squares	Degrees of Freedom	Mean Square
Filterable TKN	S_1	$Y_t = \frac{0.012 \pm 0.003 + 0.008 \pm 0.003\ \beta}{1-0.550 \pm 0.148\ \beta} X1_{t-1}$	90.5	115	0.79
		$+ \frac{1}{1-1.394 \pm 0.158\ \beta + 0.540 \pm 0.157\ \beta^2} a_t$			
	S_2	$Y_t = \frac{0.090 \pm 0.040 + 0.111 \pm 0.047\ \beta}{1-0.552 \pm 0.181\ \beta} X2_{t-1}$	118.9	114	1.04
		$+ 0.502 \pm 0.548\ X4_{t-2}$			
		$+ \frac{1}{1-1.380 \pm 0.159\ \beta + 0.543 \pm 0.157\ \beta^2} a_t$			
NO_3^--N	S_3	$Y_t = 0.049 \pm 0.057\ X2_{t-3}$	210.9	115	7.83
		$- \frac{0.004 \pm 0.002}{1-0.815 \pm 0.151\ \beta} X3_{t-1}$			
		$+ \frac{1}{1-1.127 \pm 0.183\ \beta + 0.221 \pm .182\ \beta^2} a_t$			
	S_4	$Y_t = \frac{0.048 \pm 0.054}{1 + 0.119 \pm 1.033\ \beta} X2_{t-3}$	210.8	114	1.85
		$- \frac{0.004 \pm 0.002}{1-0.815 \pm 0.153\ \beta} X3_{t-1}$			
		$+ \frac{1}{1-1.129 \pm 0.184\ \beta + 0.222 \pm 0.182\ \beta^2} a_t$			

TABLE F2 (Cont'd)

Output Variable	Model No.	Model	Residuals Sum of Squares	Degrees of Freedom	Mean Square
	S_5	$Y_t = \frac{-0.003 \pm .002}{1-0.822 \pm 0.160\ \beta} X_{3_{t-1}} + \frac{1}{1-1.200 \pm 0.175\ \beta + 0.280 \pm 0.177\ \beta^2} a_t$	225.2	116	1.94

where X_1 = TKN (filterable) loading (g/day),
X_2 = Influent TKN (filterable) concentration (mg/l), and
X_3 = OC (filterable) loading.

TABLE F3. DIAGNOSTIC CHECKING OF FINAL EFFLUENT TKN AND NO_3^--N MODELS

Output Variable	Model No.	Residual Autocorrelation Results Q	χ^2 $\alpha = .95$	Cross Correlation Results Sax_1	χ^2 $\alpha = .95$	Sax_2	χ^2 $\alpha = .95$	Sax_3	χ^2 $\alpha = .95$
Filterable TKN	S_1	16.82	22.36	9.93	22.36				
	C_1	10.28	22.36	22.09	23.68				
NO_3^--N	S_3	12.26	22.36			14.07	25.00	15.45	23.68
	C_4	9.79	23.68			12.47	25.00	8.03	23.68

where $Q = n \sum_{k=1}^{15} r^2_{aa}(k)$,

$S = n \sum_{k=1}^{15} r^2_{ax}(k)$,

r^2 = estimate of cross correlation function,

a = model residuals,

k = lag,

n = series length, and

$x = (1 - B)X$

CROSS CORRELATIONS AND V WEIGHTS FOR SSC SYSTEM FILTERABLE TKN LOADING VERSUS EFFLUENT FILTERABLE TKN

```
      DIMENSION A(24,120),X(120),Y(120),Z(120),W(120)
      CALL FORMS(1)

      IDENTIFY PARAMETERS
      X = FLOW(IGAL/MIN)
      Y = FILTERABLE RAW FEED TKN(MG/L)
      W = FILTERABLE EFFLUENT TKN(MG/L)
      Z = LOADING (GM/DAY)
      AW = MEAN FILTERABLE EFFLUENT TKN(MG/L)
      AZ = MEAN LOADING (GM/DAY)
      NOB = NUMBER OF DATA POINTS
      NL = NUMBER OF LAGS

      DATA  NOB/120/,NL/20/
      READ 1,((A(I,J),I=1,8),J=1,120)
      READ 1,((A(I,J),I=9,16),J=1,120)
      READ 1,((A(I,J),I=17,24),J=1,120)
    1 FORMAT(17X,F3.0,19X,F6.0,4X,F4.0,F5.0,F5.0,F5.0,F5.0,2X,F5.0)
    3 READ 4,(IX,IY,IW)
    4 FORMAT(3I2)
      PRINT 4,IX,IY,IW
      IF(IFEOF(60).EQ.-1) STOP
      PRINT 12
   12 FORMAT(28X,10HFILTERABLE,31X,10HFILTERABLE)
      PRINT 11
   11 FORMAT(10X,14HFLOW(IGAL/MIN),3X,12HRF TKN(MG/L),5X,
     115HLOADING(GM/DAY),8X,13HEFF TKN(MG/L))
      PRINT 9
    9 FORMAT(16X,1HX,16X,1HY,19X,1HZ,19X,1HW)
      SW=0.0
      SZ=0.0
      DO 5 K=1,NOB
      X(K)=A(IX,K)
      Y(K)=A(IY,K)
      W(K)=A(IW,K)
      Z(K)=(X(K)*Y(K))*6.552
      SZ=SZ+Z(K)
      SW=SW+W(K)
      PRINT 10,(X(K),Y(K),Z(K),W(K))
   10 FORMAT(9X,F10.2,7X,F10.2,10X,F10.2,10X,F10.2)
    5 CONTINUE
      AW=SW/FLOAT(NOB)
      AZ=SZ/FLOAT(NOB)
      PRINT 101
  101 FORMAT(///,24X,6HZ MEAN,15X,6HW MEAN)
      PRINT 102,AZ,AW
  102 FORMAT(/,20X,F10.3,10X,F10.3)
      DO 81 K=1,NOB
      W(K)=W(K)-AW
   81 Z(K)=Z(K)-AZ
      CALL IDENT TF(Z,W,NOB,NL,1)
      GO TO 3
      END
```

```
      SUBROUTINE IDENT TF(X,Y,NOB,NL,NDIFF)
C     IDENTIFICATION OF THE IMPULSE RESPONSE
C     BY INVERSION OF MATRIX
C     THIS SUBROUTINE REQUIRES THE SSPLIB
C     SSPLIB MUST BE ATTACHED
      COMMON SDA,SDX
      DIMENSION X(1),Y(1),AC(50),GAM(20,20),VGAM(400)
      DIMENSION CC1(21),CC2(21),L(400),M(400),V(20),VN(20)
      NDATA=NOB
      ND=0
      PRINT 18
   18 FORMAT(52H1    CROSS CORRELATIONS AT + AND - LAGS FOR NDIFF = 0)
    6 CALL CROSS(X,Y,NOB,NL,CC1,CC2)
      CALL ACORR(X,AC,SDZ,NOB,NL)
C     3UILDING THE MATRIX OF INPUT AUTOCORRELATION GAM
      NLL=NL-1
      DO 10 J=1,NLL
      GAM(J,J)=1.0
      II=NL-J+1
      DO 20 I=2,II
      IW=I+J-1
   20 GAM(IW,J)=AC(I-1)
   10 CONTINUE
      GAM(NL,NL)=1.0
      DO 30 J=2,NL
      JJ=J-1
      DO 40 I=1,JJ
   40 GAM(I,J)=GAM(J,I)
   30 CONTINUE
      PRINT 42,((GAM(I,J),I=1,NL),J=1,NL)
   42 FORMAT(10X,20F6.2)
C     TRANSFORMING GAM TO A VECTOR MATRIX VGAM
      DO 50 J=1,20
      DO 60 I=1,20
      IR=NL*(J-1)+I
      VGAM(IR)=GAM(I,J)
   60 CONTINUE
   50 CONTINUE
C     INVERSION OF MATRIX
C     MINV AND GMPRD ARE IBM SCIENTIFIC SUBROUTINES
      N=NL*NL
      CALL MINV(VGAM,NL,D,L,M)
      PRINT 51,D
   51 FORMAT(//////////,10X,4H D =,E2J.8)
      NLL=NL*NL
      PRINT 42,(VGAM(I),I=1,NLL)
C       CALCULATION OF THE TRANSFER FUNCTION PARAMETERS
      CALL GAS003(VGAM,CC2,V,NL,NL,1)
      CALL GAS003(VGAM,CC1,VN,NL,NL,1)
      DO 16 I=1,NL
      V(I)=V(I)*SDA/SDX
   16 VN(I)=VN(I)*SDA/SDX
C     PLOTTING PARAMETERS V
      PRINT 8,ND
    8 FORMAT(///,10X,38H V WEIGHTS AT + AND - LAGS  FOR NDIFF=,I2)
      CL=SQRT(VGAM(1)/FLOAT(NOB))*SDA*2.0/SDX
      CLN=-CL
      DO 2 K=1,NL
      T=FLOAT(K)
      TT=-T
      KK=K-1
      K1=-KK
    2 PRINT 4,K1,VN(K),KK,V(K)
    4 FORMAT(5X,I3,5X,F6.3,10X,I3,5X,F6.3)
      PRINT 12,CL
   12 FORMAT(//,53H APPROX. 95 PER CENT CONF LIMIT ON IMPULSE RESPONSE =
     1,F10.3)
      NDATA=NDATA-1
      ND=ND+1
      IF(ND.GT.NDIFF)GO TO 100
      DO 41 I=1,NDATA
      X(I)=X(I+1)-X(I)
   41 Y(I)=Y(I+1)-Y(I)
      PRINT 19
   19 FORMAT(52H1    CROSS CORRELATIONS AT + AND - LAGS FOR NDIFF = 1)
      GO TO 6
  100 RETURN
      END
```

```
      SUBROUTINE ACORR(Z,AC,SDZ,N,NL)
      DIMENSION Z(1),AC(1)
      NL1 = NL+1
      TN = N
      SZ = 0.
      DO 13 I=1,N
   13 SZ = SZ+Z(I)
      ZBAR = SZ/TN
      DO 10 JJ=1,NL1
      J = JJ-1
      SZZ = 0.
      NN = N-J
      DO 11 I=1,NN
      K=I+J
   11 SZZ=SZZ+(Z(I)-ZBAR)*(Z(K)-ZBAR)
   10 AC(JJ) = SZZ/TN
      SDZ = SQRT(AC(1))
      VZ = AC(1)
      DO 12 J=1,NL
   12 AC(J) = AC(J+1)/VZ
      RETURN
      END

      SUBROUTINE CROSS(X,A,NOB,NL,CC1,CC2)
      COMMON SDA,SDX
      DIMENSION X(NOB),A(NOB)
      DIMENSION CC1(41),CC2(41)
       CC1 ARE CROSSCORRELATIONS AT NEGATIVE LAGS
       CC2 ARE CROSSCORRELATION AT POSITIVE LAGS
      CALL CRCORR(X,A,CC2,SDX,SDA,NOB,NL)
      CALL CRCORR(A,X,CC1,SDA,SDX,NOB,NL)
      PRINT 6
    6 FORMAT(79H     CROSS-CORRELATIONS BETWEEN MANIPULATED VARIABLES  +
     1RESIDUALS    X(T)*A(T+K),//)
      NL1 = NL+1
      DO 7 K=1,NL1
      KK = K-1
      K1 = -KK
    7 PRINT 8 , K1,CC1(K),KK,CC2(K)
    8 FORMAT (5X,I3,5X,F6.3,10X,I3,5X,F6.3)
      CL = 2.0/SQRT(FLOAT(NOB))
      PRINT 12 , CL
   12 FORMAT(//,55H APPROX. 95 PERCENT CONF. LIMIT ON CROSS-CORRELATIONS
     1 =,F6.3)
      PRINT 9, SDX,SDA
    9 FORMAT(/,28H STANDARD DEVIATIONS  S(X) =,F12.4,5X,6HS(A) =,E12.4)
      Q = 0.
      DO 10 J=1,NL1
   10 Q = Q+              CC2(J)*CC2(J)
      Q = Q*FLOAT(NOB)
      NDF = NL+1
      PRINT 11, Q,NDF
   11 FORMAT(/,25H CHI SQUARED STATISTIC = ,F6.2,/,10H BASED ON(,I2,46H
     1NO. OF DYNAMIC PARAMETERS) DEGREES OF FREEDOM)
      RETURN
      END

      SUBROUTINE CRCORR(X,Y,CC,SDX,SDY,N,NL)
      DIMENSION X(N),Y(N),CC(1)
      SX = 0.
      SY = 0.
      SXX = 0.
      SYY = 0.
      DO 2 I=1,N
      SX = SX+X(I)
      SY = SY+Y(I)
      SXX = SXX+X(I)*X(I)
    2 SYY = SYY+Y(I)*Y(I)
      TN = N
      SDX = SQRT((SXX-SX*SX/TN)/TN)
      SDY = SQRT((SYY-SY*SY/TN)/TN)
      NL1 = NL+1
      DO 3 K=1,NL1
      SXY = 0.
      NN = N-K+1
      DO 4 I=1,NN
      KK = I+K-1
    4 SXY = SXY+(X(I)-SX/TN)*(Y(KK)-SY/TN)
    3 CC(K) = (SXY/TN)/(SDX*SDY)
      RETURN
```

FLOW(IGAL/MIN) X	FILTERABLE RF TKN(MG/L) Y	LOADING(GM/DAY) Z	FILTERABLE EFF TKN(MG/L) W
1.00	22.20	145.45	1.00
1.00	23.10	151.35	0.70
1.00	25.60	157.73	0.80
1.00	22.70	148.73	1.00
1.00	20.40	133.66	0.70
1.00	24.90	163.14	0.90
2.00	20.70	271.25	1.30
2.00	13.30	174.28	2.70
2.00	12.70	166.42	3.30
2.00	11.40	149.39	3.10
2.00	9.00	117.94	1.70
2.00	8.80	115.32	1.10
2.00	15.10	197.87	2.90
2.00	23.90	313.19	3.30
2.00	24.30	318.43	7.20
2.00	22.50	294.84	8.00
2.00	21.90	286.98	9.40
2.00	20.90	273.87	10.10
1.00	21.60	141.52	11.70
1.00	35.10	229.98	12.20
1.00	33.90	222.11	13.10
1.00	28.70	188.04	13.70
1.00	27.20	178.21	14.00
1.00	35.50	232.60	11.40
2.00	37.80	495.33	12.30
2.00	14.30	187.39	10.90
2.00	14.60	191.32	7.20
2.00	11.20	146.76	4.90
2.00	12.90	169.04	2.60
2.00	14.10	184.77	1.60
1.00	16.40	107.45	3.40
1.00	18.40	120.56	5.90
1.00	16.10	105.49	8.30
1.00	13.90	91.07	9.40
1.00	9.90	64.86	9.20
1.00	8.80	57.66	8.00
1.00	19.50	127.76	5.60
1.00	14.50	95.00	4.50
1.00	17.30	113.35	2.60
1.00	14.00	91.73	2.00
1.00	14.40	94.35	1.70
1.00	14.00	91.73	1.40
2.00	13.50	176.90	1.50
2.00	29.30	383.95	4.10
2.00	25.40	332.84	9.20
2.00	22.30	292.22	10.80
2.00	18.90	247.67	10.50
2.00	25.10	328.91	9.90
1.00	22.40	146.76	10.40
1.00	12.00	78.62	7.50
1.00	6.50	42.59	5.00
1.00	5.30	34.73	1.40
1.00	4.00	26.21	1.20
1.00	5.50	36.04	1.10
1.00	6.00	39.31	1.00
1.00	9.00	58.97	1.10
1.00	12.00	78.62	1.20
1.00	12.10	79.28	1.20
1.00	10.00	65.52	1.10
1.00	6.00	39.31	2.50
2.00	2.00	26.21	5.50
2.00	3.50	45.86	2.50
2.00	5.00	65.52	1.40
2.00	6.70	87.80	1.20
2.00	6.00	78.62	1.10
2.00	5.00	65.52	1.00
2.00	4.20	55.04	1.00
2.00	8.00	104.83	1.00
2.00	12.00	137.25	1.00
2.00	14.80	193.94	1.40
2.00	12.00	157.25	1.80
2.00	13.50	176.90	1.50
1.00	16.90	110.73	1.20
1.00	25.50	167.08	1.00
1.00	29.00	190.01	1.00
[illegible]	[illegible].00	170.35	2.20

1.00	26.00	170.35	5.00
1.00	22.40	146.76	5.40
1.00	28.00	183.46	6.50
1.00	29.50	193.28	7.20
1.00	28.40	186.08	8.10
1.00	29.00	190.01	8.50
1.00	31.00	203.11	9.00
2.00	33.10	433.74	9.40
2.00	32.50	425.88	13.00
2.00	27.00	353.81	14.50
2.00	19.20	251.60	14.80
2.00	26.00	340.70	15.50
2.00	30.50	399.67	16.00
2.00	31.50	412.78	18.40
2.00	21.50	281.74	16.50
2.00	16.00	209.66	14.00
2.00	14.50	190.01	10.00
2.00	13.50	176.90	7.00
2.00	20.00	252.08	7.00
1.00	13.00	85.16	9.90
1.00	12.40	81.24	17.10
1.00	11.90	77.97	8.60
1.00	10.50	68.80	2.10
1.00	12.00	78.62	1.00
1.00	10.20	66.83	0.90
2.00	10.80	141.52	0.90
2.00	17.70	231.94	0.80
2.00	15.90	208.35	3.30
2.00	16.20	212.28	4.70
2.00	10.90	142.83	6.20
2.00	11.10	145.45	6.70
1.00	22.70	148.73	7.20
1.00	18.70	122.52	8.80
1.00	14.20	93.04	8.80
1.00	13.90	91.07	8.20
1.00	13.60	89.11	7.30
1.00	11.60	76.00	6.60
2.00	10.40	136.28	5.80
2.00	15.90	208.35	5.70
2.00	15.70	205.73	7.50
2.00	14.50	190.01	8.10
2.00	9.40	123.18	7.20
2.00	9.80	128.42	5.00

Z MEAN	W MEAN
166.677	5.854

CROSS CORRELATIONS AT + AND - LAGS FOR NDIFF = 0
CROSS-CORRELATIONS BETWEEN MANIPULATED VARIABLES + RESIDUALS X(T)*A(T+K)

-0	0.525	0	0.525
-1	0.394	1	0.646
-2	0.304	2	0.681
-3	0.225	3	0.619
-4	0.138	4	0.535
-5	0.083	5	0.486
-6	0.038	6	0.454
-7	0.013	7	0.406
-8	-0.020	8	0.329
-9	-0.071	9	0.225
-10	-0.115	10	0.133
-11	-0.179	11	0.103
-12	-0.233	12	0.083
-13	-0.295	13	0.041
-14	-0.337	14	-0.043
-15	-0.371	15	-0.062
-16	-0.388	16	-0.030
-17	-0.359	17	-0.006
-18	-0.310	18	-0.005
-19	-0.268	19	0.003
-20	-0.233	20	0.030

TABLE F4 (Cont'd)

APPROX. 95 PERCENT CONF. LIMIT ON CROSS-CORRELATIONS = 0.183

STANDARD DEVIATIONS S(X) = 95.8213 S(A) = 0.4564E+01

CHI SQUARED STATISTIC = 316.48
BASED ON(21 NO. OF DYNAMIC PARAMETERS) DEGREES OF FREEDOM

1.00	0.75	0.55	0.41	0.36	0.27	0.12	0.08	0.02	0.00	-0.01	-0.03	-0.09	-0.11	-0.09	-0.10	-0.11	-0.12	-0.08	-0.04
0.75	1.00	0.75	0.55	0.41	0.36	0.27	0.12	0.08	0.02	0.00	-0.01	-0.03	-0.09	-0.11	-0.09	-0.10	-0.11	-0.12	-0.06
0.55	0.75	1.00	0.75	0.55	0.41	0.36	0.27	0.12	0.08	0.02	0.00	-0.01	-0.03	-0.09	-0.11	-0.09	-0.10	-0.11	-0.12
0.41	0.55	0.75	1.00	0.75	0.55	0.41	0.36	0.27	0.12	0.08	0.02	0.00	-0.01	-0.03	-0.03	-0.11	-0.09	-0.10	-0.11
0.36	0.41	0.55	0.75	1.00	0.75	0.55	0.41	0.36	0.27	0.12	0.08	0.02	0.00	-0.01	-0.03	-0.03	-0.11	-0.09	-0.10
0.27	0.36	0.41	0.55	0.75	1.00	0.75	0.55	0.41	0.36	0.27	0.12	0.08	0.02	0.00	-0.01	-0.03	-0.09	-0.11	-0.09
0.12	0.27	0.36	0.41	0.55	0.75	1.00	0.75	0.55	0.41	0.36	0.27	0.12	0.08	0.02	0.00	-0.01	-0.03	-0.09	-0.11
0.08	0.12	0.27	0.36	0.41	0.55	0.75	1.00	0.75	0.55	0.41	0.35	0.27	0.12	0.08	0.02	0.00	-0.01	-0.03	-0.09
0.02	0.38	0.12	0.27	0.35	0.41	0.55	0.75	1.00	0.75	0.55	0.41	0.36	0.27	0.12	0.08	0.02	0.00	-0.01	-0.03
0.00	0.02	0.08	0.12	0.27	0.36	0.41	0.55	0.75	1.00	0.75	0.55	0.41	0.36	0.27	0.12	0.08	0.02	0.00	-0.01
-0.01	0.00	0.02	0.08	0.12	0.27	0.36	0.41	0.55	0.75	1.00	0.75	0.55	0.41	0.36	0.27	0.12	0.08	0.02	0.00
-0.03	-0.01	0.00	0.02	0.08	0.12	0.27	0.36	0.41	0.55	0.75	1.00	0.75	0.55	0.41	0.36	0.27	0.12	0.08	0.02
-0.09	-0.03	-0.01	0.00	0.02	0.08	0.12	0.27	0.36	0.41	0.55	0.75	1.00	0.75	0.55	0.41	0.36	0.27	0.12	0.08
-0.11	-0.09	-0.03	-0.01	0.00	0.02	0.08	0.12	0.27	0.36	0.41	0.55	0.75	1.00	0.75	0.55	0.41	0.36	0.27	0.12
-0.09	-0.11	-0.09	-0.03	-0.01	0.00	0.02	0.08	0.12	0.27	0.36	0.41	0.55	0.75	1.00	0.75	0.55	0.41	0.36	0.27
-0.10	-0.09	-0.11	-0.09	-0.03	-0.01	0.00	0.02	0.08	0.12	0.27	0.36	0.41	0.55	0.75	1.00	0.75	0.55	0.41	0.36
-0.11	-0.10	-0.09	-0.11	-0.09	-0.03	-0.01	0.00	0.02	0.08	0.12	0.27	0.36	0.41	0.55	0.75	1.00	0.75	0.55	0.41
-0.12	-0.11	-0.10	-0.09	-0.11	-0.09	-0.03	-0.01	0.00	0.02	0.08	0.12	0.27	0.36	0.41	0.55	0.75	1.00	0.75	0.55
-0.08	-0.12	-0.11	-0.10	-0.09	-0.11	-0.09	-0.03	-0.01	0.00	0.02	0.09	0.12	0.27	0.36	0.41	0.55	0.75	1.00	0.75
-0.04	-0.08	-0.12	-0.11	-0.10	-0.09	-0.11	-0.09	-0.03	-0.01	0.00	0.02	0.08	0.12	0.27	0.36	0.41	0.55	0.75	1.00

D = 0.38915090E-07

2.59	-2.07	0.01	0.44	-0.66	-0.15	0.98	-0.76	0.24	0.32	-0.47	-0.11	0.64	-0.36	-0.05	0.26	-0.12	0.06	0.06	-0.14
-2.07	4.23	-2.07	-0.34	0.96	-0.53	-0.93	1.56	-0.92	-0.02	0.67	-0.36	-0.61	0.89	-0.27	-0.26	0.31	-0.14	0.01	0.06
0.01	-2.07	4.23	-2.07	-0.34	0.96	-0.52	-0.92	1.55	-0.91	-0.01	0.66	-0.37	-0.59	0.87	-0.27	-0.25	0.30	-0.14	0.06
0.44	-0.34	-2.07	4.31	-2.18	-0.37	1.13	-0.65	-0.90	1.61	-0.98	-0.03	0.76	-0.41	-0.62	0.91	-0.27	-0.25	0.31	-0.12
-0.66	0.96	-0.34	-2.18	4.47	-2.13	-0.62	1.30	-0.68	-0.98	1.70	-0.94	-0.19	0.82	-0.36	-0.70	0.91	-0.27	-0.26	0.26
-0.15	-0.53	0.96	-0.37	-2.13	4.45	-2.18	-0.54	1.23	-0.69	-0.91	1.68	-1.00	-0.09	0.73	-0.36	-0.62	0.87	-0.27	-0.05
0.98	-0.93	-0.52	1.13	-0.62	-2.18	4.82	-2.48	-0.44	1.34	-0.87	-0.94	1.93	-1.15	-0.09	0.82	-0.41	-0.59	0.89	-0.36
-0.76	1.56	-0.92	-0.65	1.30	-0.54	-2.48	4.99	-2.46	-0.55	1.41	-0.79	-1.10	1.93	-1.00	-0.19	0.76	-0.37	-0.61	0.64
0.24	-0.92	1.55	-0.90	-0.68	1.23	-0.44	-2.46	4.85	-2.40	-0.48	1.33	-0.79	-0.94	1.68	-0.94	-0.03	0.06	-0.36	-0.11
0.32	-0.02	-0.91	1.61	-0.98	-0.69	1.34	-0.55	-2.40	4.89	-2.48	-0.48	1.41	-0.87	-0.91	1.70	-0.98	-0.01	0.67	-0.47
-0.47	0.67	-0.01	-0.98	1.70	-0.91	-0.87	1.41	-0.48	-2.48	4.89	-2.40	-0.55	1.34	-0.69	-0.98	1.61	-0.91	-0.02	0.32
-0.11	-0.36	0.66	-0.03	-0.94	1.68	-0.94	-0.79	1.37	-0.48	-2.40	4.85	-2.46	-0.44	1.23	-0.68	-0.90	1.55	-0.92	0.24
0.64	-0.61	-0.37	0.76	-0.19	-1.00	1.93	-1.10	-0.79	1.41	-0.55	-2.46	4.93	-2.48	-0.54	1.30	-0.65	-0.92	1.56	-0.76
-0.36	0.89	-0.59	-0.41	0.82	-0.09	-1.15	1.93	-0.94	-0.87	1.34	-0.44	-2.48	4.82	-2.18	-0.62	1.13	-0.52	-0.93	0.98
-0.05	-0.27	0.87	-0.62	-0.36	0.73	-0.09	-1.00	1.68	-0.91	-0.69	1.23	-0.54	-2.18	4.45	-2.13	-0.37	0.96	-0.53	-0.15
0.26	-0.26	-0.27	0.91	-0.70	-0.35	0.82	-0.19	-0.94	1.70	-0.93	-0.68	1.30	-0.62	-2.13	4.47	-2.18	-0.34	0.95	-0.66
-0.12	0.31	-0.25	-0.27	0.91	-0.62	-0.41	0.76	-0.03	-0.98	1.61	-0.90	-0.65	1.13	-0.37	-2.18	4.31	-2.07	-0.34	0.44
0.06	-0.14	0.30	-0.25	-0.27	0.87	-0.59	-0.37	0.66	-0.01	-0.91	1.55	-0.92	-0.52	0.96	-0.34	-2.07	4.23	-2.07	0.01
0.06	0.01	-0.14	0.31	-0.26	-0.27	0.89	-0.51	-0.36	0.67	-0.02	-0.92	1.56	-0.93	-0.53	0.95	-0.34	-2.07	4.23	-2.07
-0.14	0.06	0.06	-0.12	0.26	-0.05	-0.35	0.64	-0.11	-0.47	0.32	0.24	-0.76	0.98	-0.15	-0.66	0.44	0.01	-2.07	2.59

TABLE F4 (Cont'd)

V WEIGHTS AT + AND - LAGS FOR NDIFF= 0

-0	0.026	0	0.006
-1	-0.003	1	0.012
-2	0.000	2	0.012
-3	0.005	3	0.005
-4	-0.007	4	0.002
-5	-0.004	5	0.002
-6	0.006	6	0.003
-7	-0.004	7	0.006
-8	0.002	8	0.004
-9	0.003	9	0.001
-10	-0.003	10	-0.002
-11	-0.004	11	-0.000
-12	0.005	12	0.000
-13	-0.006	13	0.005
-14	-0.003	14	-0.004
-15	-0.001	15	-0.003
-16	-0.007	16	0.001
-17	-0.003	17	0.002
-18	0.000	18	0.000
-19	-0.006	19	0.004

APPROX. 95 PER CENT CONF LIMIT ON IMPULSE RESPONSE = 0.014

CROSS CORRELATIONS AT + AND - LAGS FOR NDIFF = 1
CROSS-CORRELATIONS BETWEEN MANIPULATED VARIABLES + RESIDUALS .X(T)*A(T+K)

-0	0.024	0	0.024
-1	-0.118	1	0.281
-2	-0.030	2	0.327
-3	0.018	3	0.069
-4	-0.116	4	-0.113
-5	-0.026	5	-0.060
-6	-0.026	6	0.043
-7	-0.000	7	0.098
-8	0.060	8	0.093
-9	-0.023	9	-0.044
-10	0.057	10	-0.198
-11	-0.043	11	-0.031
-12	0.051	12	0.073
-13	-0.036	13	0.140
-14	-0.027	14	-0.205
-15	-0.073	15	-0.161
-16	-0.151	16	0.026
-17	-0.069	17	0.068
-18	-0.018	18	-0.030
-19	0.049	19	-0.060
-20	-0.012	20	0.092

APPROX. 95 PERCENT CONF. LIMIT ON CROSS-CORRELATIONS = 0.183

STANDARD DEVIATIONS S(X) = 68.2263 S(A) = 0.1961E+01

CHI SQUARED STATISTIC = 45.79
BASED ON(21 NO. OF DYNAMIC PARAMETERS) DEGREES OF FREEDOM

1.00	-0.12	-0.10	-0.17	0.07	0.11	-0.22	0.04	-0.09	-0.02	0.04	0.08	-0.09	-0.06	0.05	0.03	-0.02	-0.11	0.00	0.13
-0.12	1.00	-0.12	-0.10	-0.17	0.07	0.11	-0.22	0.04	-0.09	-0.02	0.04	0.08	-0.09	-0.06	0.05	0.03	-0.02	-0.11	0.00
-0.10	-0.12	1.00	-0.12	-0.10	-0.17	0.07	0.11	-0.22	0.04	-0.09	-0.02	0.04	0.08	-0.09	-0.06	0.05	0.03	-0.02	-0.11
-0.17	-0.10	-0.12	1.00	-0.12	-0.10	-0.17	0.07	0.11	-0.22	0.04	-0.09	-0.02	0.04	0.08	-0.09	-0.06	0.05	0.03	-0.02
0.07	-0.17	-0.10	-0.12	1.00	-0.12	-0.10	-0.17	0.07	0.11	-0.22	0.04	-0.09	-0.02	0.04	0.08	-0.09	-0.06	0.05	0.03
0.11	0.07	-0.17	-0.10	-0.12	1.00	-0.12	-0.10	-0.17	0.07	0.11	-0.22	0.04	-0.09	-0.02	0.04	0.08	-0.09	-0.06	0.05
-0.22	0.11	0.07	-0.17	-0.10	-0.12	1.00	-0.12	-0.10	-0.17	0.07	0.11	-0.22	0.04	-0.09	-0.02	0.04	0.08	-0.09	-0.06
0.04	-0.22	0.11	0.07	-0.17	-0.10	-0.12	1.00	-0.12	-0.10	-0.17	0.07	0.11	-0.22	0.04	-0.09	-0.02	0.04	0.08	-0.09
-0.09	0.04	-0.22	0.11	0.07	-0.17	-0.10	-0.12	1.00	-0.12	-0.10	-0.17	0.07	0.11	-0.22	0.04	-0.09	-0.02	0.04	0.06
-0.02	-0.09	0.04	-0.22	0.11	0.07	-0.17	-0.10	-0.12	1.00	-0.12	-0.10	-0.17	0.07	0.11	-0.22	0.04	-0.09	-0.02	0.04
0.04	-0.02	-0.09	0.04	-0.22	0.11	0.07	-0.17	-0.10	-0.12	1.00	-0.12	-0.10	-0.17	0.07	0.11	-0.22	0.04	-0.09	-0.02
0.08	0.04	-0.02	-0.09	0.04	-0.22	0.11	0.07	-0.17	-0.10	-0.12	1.00	-0.12	-0.10	-0.17	0.07	0.11	-0.22	0.04	-0.09
-0.09	0.08	0.04	-0.02	-0.09	0.04	-0.22	0.11	0.07	-0.17	-0.10	-0.12	1.00	-0.12	-0.10	-0.17	0.07	0.11	-0.22	0.04
-0.06	-0.09	0.08	0.04	-0.02	-0.09	0.04	-0.22	0.11	0.07	-0.17	-0.10	-0.12	1.00	-0.12	-0.10	-0.17	0.07	0.11	-0.22
0.05	-0.06	-0.09	0.08	0.04	-0.02	-0.09	0.04	-0.22	0.11	0.07	-0.17	-0.10	-0.12	1.00	-0.12	-0.10	-0.17	0.07	0.11
0.03	0.05	-0.06	-0.09	0.08	0.04	-0.02	-0.09	0.04	-0.22	0.11	0.07	-0.17	-0.10	-0.12	1.00	-0.12	-0.10	-0.17	0.07
-0.02	0.03	0.05	-0.06	-0.09	0.08	0.04	-0.02	-0.09	0.04	-0.22	0.11	0.07	-0.17	-0.10	-0.12	1.00	-0.12	-0.10	-0.17
-0.11	-0.02	0.03	0.05	-0.06	-0.09	0.08	0.04	-0.02	-0.09	0.04	-0.22	0.11	0.07	-0.17	-0.10	-0.12	1.00	-0.12	-0.10
0.00	-0.11	-0.02	0.03	0.05	-0.06	-0.09	0.08	0.04	-0.02	-0.09	0.04	-0.22	0.11	0.07	-0.17	-0.10	-0.12	1.00	-0.12
0.13	0.00	-0.11	-0.02	0.03	0.05	-0.06	-0.09	0.08	0.04	-0.02	-0.09	0.04	-0.22	0.11	0.07	-0.17	-0.10	-0.12	1.00

D = 0.56131280E-01

1.27	0.18	0.16	0.38	0.02	-0.03	0.45	0.01	0.15	0.31	0.00	-0.04	0.30	0.03	0.04	0.18	0.05	0.11	0.14	-0.12
0.18	1.29	0.21	0.22	0.39	0.03	0.03	0.45	0.06	0.19	0.31	0.03	0.02	0.30	0.08	0.06	0.19	0.10	0.14	0.14
0.16	0.21	1.29	0.25	0.22	0.37	0.08	0.03	0.44	0.10	0.19	0.27	0.05	0.02	0.26	0.10	0.06	0.16	0.10	0.11
0.38	0.22	0.25	1.40	0.25	0.19	0.50	0.08	0.05	0.54	0.11	0.16	0.35	0.06	-0.01	0.31	0.11	0.06	0.19	0.05
0.02	0.39	0.22	0.25	1.40	0.24	0.20	0.50	0.07	0.06	0.54	0.09	0.15	0.35	0.04	-0.00	0.31	0.10	0.06	0.18
-0.03	0.03	0.37	0.19	0.24	1.37	0.23	0.19	0.45	0.07	0.06	0.50	0.06	0.15	0.29	0.04	-0.01	0.26	0.08	0.04
0.45	0.03	0.08	0.50	0.20	0.23	1.53	0.23	0.24	0.57	0.07	0.04	0.60	0.07	0.15	0.35	0.05	0.02	0.30	0.03
0.01	0.45	0.03	0.08	0.50	0.19	0.23	1.53	0.23	0.24	0.57	0.06	0.03	0.60	0.06	0.15	0.35	0.05	0.02	0.30
0.15	0.06	0.44	0.05	0.07	0.45	0.24	0.23	1.48	0.27	0.24	0.49	0.06	0.04	0.50	0.09	0.16	0.27	0.03	-0.04
0.31	0.19	0.10	0.54	0.06	0.07	0.57	0.24	0.27	1.56	0.27	0.24	0.57	0.07	0.06	0.54	0.11	0.19	0.31	0.00
0.00	0.31	0.19	0.11	0.54	0.06	0.07	0.57	0.24	0.27	1.56	0.27	0.24	0.57	0.07	0.05	0.54	0.10	0.19	0.31
-0.04	0.03	0.27	0.16	0.09	0.50	0.04	0.05	0.49	0.24	0.27	1.48	0.23	0.24	0.45	0.07	0.05	0.44	0.06	0.15
0.30	0.02	0.05	0.35	0.15	0.06	0.60	0.03	0.06	0.57	0.24	0.23	1.53	0.23	0.19	0.50	0.08	0.03	0.45	0.01
0.03	0.30	0.02	0.06	0.35	0.15	0.07	0.60	0.04	0.07	0.57	0.24	0.23	1.53	0.23	0.20	0.50	0.08	0.03	0.45
0.04	0.08	0.26	-0.01	0.04	0.29	0.15	0.06	0.50	0.06	0.07	0.45	0.19	0.23	1.37	0.24	0.19	0.37	0.03	-0.03
0.18	0.06	0.10	0.31	-0.00	0.04	0.35	0.15	0.09	0.54	0.05	0.07	0.50	0.20	0.24	1.40	0.25	0.22	0.39	0.02
0.05	0.19	0.06	0.11	0.31	-0.01	0.06	0.35	0.16	0.11	0.54	0.05	0.08	0.50	0.15	0.25	1.45	0.25	0.22	0.38
0.11	0.10	0.16	0.06	0.10	0.26	0.02	0.05	0.27	0.19	0.10	0.44	0.03	0.08	0.37	0.22	0.25	1.29	0.21	0.16
0.14	0.14	0.10	0.19	0.06	0.08	0.30	0.02	0.03	0.31	0.19	0.06	0.45	0.03	0.03	0.39	0.22	0.21	1.29	0.18
-0.12	0.14	0.11	0.05	0.18	0.04	0.03	0.30	-0.04	0.00	0.31	0.15	0.01	0.45	-0.03	0.02	0.38	0.16	0.18	1.27

V WEIGHTS AT + AND - LAGS FOR NDIFF= 1

-0	-0.001	0	0.005
-1	-0.007	1	0.012
-2	-0.003	2	0.011
-3	-0.003	3	0.005
-4	-0.007	4	0.001
-5	-0.003	5	0.001
-6	-0.002	6	0.002
-7	-0.005	7	0.005
-8	-0.001	8	0.004
-9	-0.003	9	0.001
-10	-0.003	10	-0.002
-11	-0.003	11	-0.001
-12	-0.001	12	0.000
-13	-0.005	13	0.004
-14	-0.004	14	-0.004
-15	-0.005	15	-0.004
-16	-0.008	16	0.000
-17	-0.005	17	0.001
-18	-0.003	18	-0.001
-19	-0.002	19	0.001

F4 (con d)

```
APPROX. 95 PER CENT CONF LIMIT ON IMPULSE RESPONSE =      0.006
1 1 1

   STOP
```

```
      PROGRAM SUTTON
      DIMENSION SCRAT(1000),TH(8),A(24,120)
      COMMON Z(120),W(120),X(120),Y(120)
      EXTERNAL MODELA

TRANSFER FUNCTION MODEL PARAMETER DETERMINATION FOR SSC SYSTEM EFFLUENT TKN
AS A FUNCTION OF FILTERABLE TKN LOADING

      IDENTIFY PARAMETERS
      X = FLOW(IGAL/MIN)
      Y = FILTERABLE RAW FEED TKN(MG/L)
      W = FILTERABLE EFFLUENT TKN(MG/L)
      Z = LOADING (GM/DAY)
      AW = MEAN FILTERABLE EFFLUENT TKN(MG/L)
      AZ = MEAN LOADING (GM/DAY)
      NOB = NUMBER OF DATA POINTS
      TH = CONSTANT PARAMETERS USED IN TRANSFER FUNCTION MODEL
      NP = NUMBER OF TH VALUES
      NPROB = NUMBER OF DIFFERENCINGS
```

PROGRAM IDENTICAL TO TABLE F6 EXCEPT FOR FOLLOWING SUBROUTINE AND OUTPUT

```
      SUBROUTINE MODELA (NPROB,TH,A,NOB,NP)
      DIMENSION TH(8),A(1)
      COMMON Z(120),W(120),X(120),Y(120)

      TRANSFER FUNCTION MODEL A

      A(1)=0.0
      DO 100 I=2,NOB
100   A(I)=(TH(1)*A(I-1))+W(I)
     1-(TH(1)*W(I-1))
     1-(TH(2)*Z(I-1))
      RETURN
      END
```

OUTPUT

```
 NON-LINEAR ESTIMATION, PROBLEM NUMBER  1

  120 OBSERVATIONS,     2 PARAMETERS               374 SCRATCH REQUIRED

 INITIAL PARAMETER VALUES
         1            2
  0.7700E+00   0.1500E-01

 INITIAL SUM OF SQUARES =   0.1011E+04

                                                   ITERATION NO.    1
 DETERMINANT =   0.4216E+00        ANGLE IN SCALED COORD. =24.89DEGREES
 TEST POINT PARAMETER VALUES
  0.7581E+00   0.1263E-01
```

TEST POINT SUM OF SQUARES = 0.9292E+03

PARAMETER VALUES VIA REGRESSION

1	2
0.7581E+00	0.1263E-01

~~LAMBDA = 0.100E-02~~ ~~SUM OF SQUARES~~
AFTER REGRESSION = 0.9291839E+03

ITERATION NO. 2

DETERMINANT = 0.4146E+00 ANGLE IN SCALED COORD. =17.79DEGREES

TEST POINT PARAMETER VALUES
0.7566E+00 0.1260E-01

TEST POINT SUM OF SQUARES = 0.9291E+03

PARAMETER VALUES VIA REGRESSION

1	2
0.7566E+00	0.1260E-01

LAMBDA = 0.100E-03 SUM OF SQUARES
AFTER REGRESSION = 0.9290996E+03

ITERATION NO. 3

DETERMINANT = 0.4133E+00 ANGLE IN SCALED COORD. =17.23DEGREES

TEST POINT PARAMETER VALUES
0.7564E+00 0.1261E-01

TEST POINT SUM OF SQUARES = 0.9291E+03

PARAMETER VALUES VIA REGRESSION

1	2
0.7564E+00	0.1261E-01

LAMBDA = 0.100E-04 SUM OF SQUARES
AFTER REGRESSION = 0.9290978E+03

ITERATION STOPS - RELATIVE CHANGE IN EACH PARAMETER LESS THAN 0.100E-02

~~FINAL RESIDUAL VALUES~~

0.0000E+00	-0.1215E+01	-0.1881E+01	-0.2468E+01	-0.3123E+01	-0.3001E+01
-0.3032E+01	-0.3322E+01	-0.2777E+01	-0.2920E+01	-0.4061E+01	-0.4069E+01
-0.1788E+01	-0.2066E+01	-0.1325E+00	-0.8862E+00	-0.3639E+00	-0.2287E+00
~~0.1109E+01~~	~~0.3081E+01~~	~~0.3978E+01~~	~~0.4675E+01~~	~~0.5478E+01~~	~~0.3382E+01~~
0.3978E+01	-0.9657E+00	-0.3462E+01	-0.4902E+01	-0.5989E+01	-0.6352E+01
-0.4269E+01	-0.5801E+00	0.2554E+01	0.4399E+01	0.4945E+01	0.4639E+01
+01	-	+00	+00 -	+00 -0	+01

-0.8591E+00	0.7664E+00	0.2588E+01	0.2216E+01	0.9378E+00	0.2651E+00
-0.3599E+00	-0.1814E+01	-0.2360E+01	-0.4028E+01	-0.2668E+01	-0.1480E+01
-0.7301E+00	-0.2848E-01	0.2787E+00	0.1874E+00	0.1014E-01	0.1525E+01
0.5943E+01	0.2484E+01	0.1440E+01	0.1080E+01	0.5777E+00	0.2692E+00
0.3120E+00	0.4614E+00	-0.3365E-01	-0.7843E+00	-0.1562E+01	-0.2350E+01
-0.3267E+01	-0.3100E+01	-0.3532E+01	-0.2949E+01	-0.1367E+01	-0.6144E+00
-0.3192E+00	0.9991E+00	0.1401E+01	0.1952E+01	0.2179E+01	0.2499E+01
0.2597E+01	0.3060E+01	0.2286E+01	0.1775E+01	0.3151E+01	0.3639E+01
0.4232E+01	0.1253E+01	-0.4095E+00	-0.2667E+01	-0.4453E+01	-0.3216E+01
-0.4580E+00	0.8867E+01	0.2024E+01	-0.3181E+01	-0.3186E+01	-0.2582E+01
-0.1901E+01	-0.2427E+01	-0.1390E+01	-0.7996E+00	0.3881E-01	0.9143E+00
0.1665E+01	0.3414E+01	0.3857E+01	0.3964E+01	0.3623E+01	0.3371E+01
0.3875E+01	0.2596E+01	0.3280E+01	0.2923E+01	0.1568E+01	-0.1373E+00

CORRELATION MATRIX

	1	2
1	1.0000	
2	-0.7660	1.0000

NORMALIZING ELEMENTS

1	2
0.1145E-01	0.5161E-03

VARIANCE OF RESIDUALS = 0.7874E+01, 118 DEGREES OF FREEDOM

INDIVIDUAL CONFIDENCE LIMITS FOR EACH PARAMETER (ON LINEAR HYPOTHESIS)

1	2
0.8206E+00	0.1551E-01
0.6921E+00	0.9716E-02

AUTO AND PARTIAL CORRELATIONS OF THE RESIDUALS

I	AUTO	PARTIAL
1	0.800	0.800
2	0.524	-0.321
3	0.266	-0.095
4	0.063	-0.057
5	-0.084	-0.069
6	-0.187	-0.077
7	-0.210	0.067
8	-0.227	-0.149
9	-0.217	0.012
10	-0.184	-0.007
11	-0.143	-0.030
12	-0.095	0.001
13	-0.107	-0.176

TABLE F5 (Cont'd)

14	-0.1-3	-0.[illegible]82
15	-0.170	-0.011
16	-0.171	-0.020
17	-0.157	-[illegible].059
18	-0.1[illegible]3	[illegible].090
19	0.001	[illegible].070
20	0.1[illegible]1	0.015

APPROX. 95 PERCENT CONF. LIMIT ON CORRELATIONS = 0.183

CHI-SQUARED STATISTIC = 154.78
BASED ON (20 - NO. OF STOCHASTIC PARAMETERS) DEGREES OF FREEDOM

STOP

```
      PROGRAM SUTTON
      DIMENSION SCRAT(1000),TH(8),A(24,120)
      COMMON Z(120),W(120),X(120),Y(120)
      EXTERNAL MODELA

TRANSFER FUNCTION - NOISE MODEL PARAMETER DETERMINATION FOR SSC SYSTEM
EFFLUENT TKN AS A FUNCTION OF FILTERABLE TKN LOADING

      IDENTIFY PARAMETERS
      X = FLOW(IGAL/MIN)
      Y = FILTERABLE RAW FEED TKN(MG/L)
      W = FILTERABLE EFFLUENT TKN(MG/L)
      Z = LOADING (GM/DAY)
      AW = MEAN FILTERABLE EFFLUENT TKN(MG/L)
      AZ = MEAN LOADING (GM/DAY)
      NOB = NUMBER OF DATA POINTS
      TH = CONSTANT PARAMETERS USED IN TRANSFER FUNCTION NOISE MODEL
      NP = NUMBER OF TH VALUES
      NPROB = NUMBER OF DIFFERENCINGS

      DATA MIT,FLAM,FNU/10,.01,10./
      DATA EPS1,EPS2/1.0E-07,1.0E-03/
      READ 1,((A(I,J),I=1,8),J=1,120)
      READ 1,((A(I,J),I=9,16),J=1,120)
      READ 1,((A(I,J),I=17,24),J=1,120)
    1 FORMAT(17X,F3.0,19X,F6.0,4X,F4.0,F5.0,F5.0,F5.0,F5.0,2X,F5.0)
    3 READ 4,IX,IY,IW,ICOUNT
      IF(IFEOF(60).EQ.-1) STOP
    4 FORMAT(4I2)
      PRINT 4,IX,IY,IW,ICOUNT
      READ 8,NPROB,NOB,NP
    8 FORMAT(3I5)
      PRINT 50,NPROB,NOB,NP
   50 FORMAT(10X,3I5)
      READ 2,(TH(I),I=1,NP)
    2 FORMAT(F5.2)
      PRINT 12
   12 FORMAT(28X,10HFILTERABLE,31X,10HFILTERABLE)
      PRINT 11
   11 FORMAT(10X,14HFLOW(IGAL/MIN),3X,12HRF TKN(MG/L),5X,
     115HLOADING(GM/DAY),8X,13HEFF TKN(MG/L))
      PRINT 9
    9 FORMAT(16X,1HX,16X,1HY,19X,1HZ,19X,1HW)
      SZ=0.0
      SW=0.0
      DO 5 K=1,NOB
      X(K)=A(IX,K)
      Y(K)=A(IY,K)
      W(K)=A(IW,K)
      Z(K)=(X(K)*Y(K))*6.552
      SW=SW+W(K)
      SZ=SZ+Z(K)
      PRINT 10,(X(K),Y(K),Z(K),W(K))
   10 FORMAT(9X,F10.2,7X,F10.2,10X,F10.2,10X,F10.2)
    5 CONTINUE
      AW=SW/FLOAT(NOB)
      AZ=SZ/FLOAT(NOB)
      PRINT 202
  202 FORMAT(///,24X,6HZ MEAN,15X,6HW MEAN)
      PRINT 201,AZ,AW
  201 FORMAT(/,20X,F10.3,10X,F10.3)
      DO 81 K=1,NOB
      W(K)=W(K)-AW
   81 Z(K)=Z(K)-AZ
      IF(ICOUNT.EQ.1)GO TO 91
      IF(ICOUNT.EQ.2)GO TO 92
      IF(ICOUNT.EQ.3)GO TO 93
      IF(ICOUNT.EQ.4)GO TO 94
      IF(ICOUNT.EQ.5)GO TO 95
      IF(ICOUNT.EQ.6)GO TO 96
      IF(ICOUNT.EQ.7)GO TO 97
      IF(ICOUNT.EQ.8)GO TO 98
```

```
      IF(ICOUNT.EQ.9)GO TO 99
      IF(ICOUNT.EQ.10) GO TO 100
      IF(ICOUNT.EQ.11) GO TO 101
   91 CALL TSHAUS(NPROB,MODELA,NOB,NP,TH,EPS1,EPS2,MIT,FLAM,FNU,SCRAT)
      GO TO 3
   92 CALL TSHAUS(NPROB,MODELB,NOB,NP,TH,EPS1,EPS2,MIT,FLAM,FNU,SCRAT)
      GO TO 3
   93 CALL TSHAUS(NPROB,MODELC,NOB,NP,TH,EPS1,EPS2,MIT,FLAM,FNU,SCRAT)
      GO TO 3
   94 CALL TSHAUS(NPROB,MODELD,NOB,NP,TH,EPS1,EPS2,MIT,FLAM,FNU,SCRAT)
      GO TO 3
   95 CALL TSHAUS(NPROB,MODELE,NOB,NP,TH,EPS1,EPS2,MIT,FLAM,FNU,SCRAT)
      GO TO 3
   96 CALL TSHAUS(NPROB,MODELF,NOB,NP,TH,EPS1,EPS2,MIT,FLAM,FNU,SCRAT)
      GO TO 3
   97 CALL TSHAUS(NPROB,MODELG,NOB,NP,TH,EPS1,EPS2,MIT,FLAM,FNU,SCRAT)
      GO TO 3
   98 CALL TSHAUS(NPROB,MODELH,NOB,NP,TH,EPS1,EPS2,MIT,FLAM,FNU,SCRAT)
      GO TO 3
   99 CALL TSHAUS(NPROB,MODELI,NOB,NP,TH,EPS1,EPS2,MIT,FLAM,FNU,SCRAT)
      GO TO 3
  100 CALL TSHAUS(NPROB,MODELJ,NOB,NP,TH,EPS1,EPS2,MIT,FLAM,FNU,SCRAT)
      GO TO 3
  101 CALL TSHAUS(NPROB,MODELK,NOB,NP,TH,EPS1,EPS2,MIT,FLAM,FNU,SCRAT)
      GO TO 3
      END


      SUBROUTINE MODELA (NPROB,TH,A,NOB,NP)
      DIMENSION TH(8),A(1)
      COMMON Z(120),W(120),X(120),Y(120)


      TRANSFER FUNCTION NOISE MODEL A


      A(1)=0.0
      A(2)=0.0
      A(3)=0.0
      DO 100 I=4,NOB
  100 A(I)=(TH(1)*A(I-1))+W(I)-(TH(3)*W(I-1))
     1+(TH(4)*W(I-2))
     1-(TH(1)*W(I-1))
     1+(TH(3)*TH(1)*W(I-2))
     1-(TH(4)*TH(1)*W(I-3))
     1-(TH(2)*Z(I-1))
     1+(TH(3)*TH(2)*Z(I-2))
     1-(TH(4)*TH(2)*Z(I-3))
      RETURN
      END


      SUBROUTINE TSHAUS(NPROB,MODEL,NOB,NP,TH,EPS1,EPS2,MIT,FLAM,FNU,
     1 SCRAT)
      RESIDUALS ARE RETURNED IN SCRAT(IG) WHERE IG=5*NP+1
      DIMENSION SCRAT(1)
      IA=1
      IB=IA+NP
      IC=IB+NP
      ID=IC+NP
      IE=ID+NP
      IG = IE+NP
      IH=IG+NOB
      II = IH + NP * NOB
      IJ = IH
          CALL  HAUSTS(NPROB,MODEL,NOB,  NP,TH,              EPS1,EPS2,MIT
     1,FLAM,FNU,   SCRAT(IA),  SCRAT(IB),  SCRAT(IC),  SCRAT(ID),
     2 SCRAT(IE),              SCRAT(IG),  SCRAT(IH),  SCRAT(II),SCRAT(IJ))
      RETURN
      END
```

```
      SUBROUTINE HAUSTS(NPR3O, MODEL, NBO,    NQ,TH,            EP1S,EP2S,
     1MIT,FLAM,FNU,    Q,P,E,PHI,TB,   R,A,D,DELZ)
                  FORTRAN II VERSION
      ADAPTED FOR THE CDC 6400  (J. F. MACGREGOR  9/72)

      DIMENSION TH(NQ), R(NBO)
      DIMENSION Q(NQ), P(NQ), E(NQ), PHI(NQ), TB(NQ)
      DIMENSION A(NQ,NQ), D(NQ,NQ), DELZ(NBO,NQ)
      DIMENSION TH(1),                                Q(1), P(1), E(1),
     1   PHI(1), TB(1),         R(1), A(1), D(1), DELZ(1)
      DIMENSION AC(16),PP(16)
      ACOS(X) = ATAN(SCRT(1.0/X**2 - 1.0))
      NP = NQ
      NPROB = NPR3O
      NOB = NBO
      EPS1 = EP1S
      EPS2 = EP2S
      NPSQ = NP * NP
       NSCRAC = 5*NP+NPSQ +  NOB+NP*NOB
       PRINT 1000, NPROB, NOB, NP, NSCRAC
      PRINT 1001
       CALL GASS60(1, NP, TH, TEMP, TMEP)
      IF(MIN0(NP-1,50-NP,NOB-NP,MIT-1,999-MIT))99,15,15
15    IF(FNU-1.0)99, 99, 16
16    CONTINUE
      DO 19 I=1,NP
      IF( ABS(TH(I)) )  99,99,19
19    CONTINUE
      GA = FLAM
      NIT = 1
      IF(EPS1) 5,70,70
5     EPS1 = 0
  70  SSQ = 0
      CALL MODEL(NPROB, TH, R, NOB, NP)
      DO 90 I = 1, NOB
  90  SSQ=SSQ+R(I)*R(I)
      PRINT 1003, SSQ

                                                  BEGIN ITERATION

100   GA = GA / FNU
      INTCNT = 0
      PRINT 1004, NIT
101   JS = 1 - NOB
      DO 130 J=1,NP
      TEMP = TH(J)
      P(J) = 0.01*TH(J)
      TH(J)= TH(J)+P(J)
      Q(J)=0
      JS = JS + NOB
      CALL MODEL(NPROB, TH, DELZ(JS), NOB, NP)
      IJ = JS-1
      DO 120 I = 1, NOB
      IJ = IJ + 1
      DELZ(IJ) = R(I) - DELZ(IJ)
120   Q(J) = Q(J) + DELZ(IJ) * R(I)
      Q(J)= Q(J)/P(J)
                                       Q=XT*R (STEEPEST DESCENT)
 130  TH(J) = TEMP
131   DO 150 I = 1, NP
      DO 151 J=1,I
      SUM = 0
      KJ = NOB*(J-1)
      KI = NOB*(I-1)
      DO 160 K = 1, NOB
      KI = KI + 1
      KJ = KJ + 1
160   SUM = SUM + DELZ(KI) * DELZ(KJ)
      TEMP= SUM/(P(I)*P(J))
      JI = J + NP*(I-1)
      D(JI) = TEMP
      IJ = I + NP*(J-1)
151   D(IJ) = TEMP
150   E(I) = SQRT(D(JI))
666   CONTINUE
      DO 153  I = 1, NP
      IJ = I-NP
      DO 153 J=1,I
```

```
      IJ = IJ + NP
      A(IJ) = D(IJ) / (E(I)*E(J))
      JI = J + NP*(I-1)
  153 A(JI) = A(IJ)
                                               A= SCALED MOMENT MATRIX
      II = - NP
      DO 155 I=1,NP
      P(I)=Q(I)/E(I)
      PHI(I)=P(I)
      II = NP + 1 + II
  155 A(II) = A(II) + GA

      I=1
       CALL MATIN(A, NP, P, I, DET)
                                               P/E = CORRECTION VECTOR
       STEP=1.0
      SUM1=0.
      SUM2=0.
      SUM3=0.
      DO 231 I=1,NP
      SUM1=P(I)*PHI(I)+SUM1
      SUM2=P(I)*P(I)+SUM2
      SUM3= PHI(I) * PHI(I) + SUM3
  231 PHI(I) = P(I)
       TEMP = SUM1/SQRT(SUM2*SUM3)
      TEMP = AMIN1(TEMP, 1.0)
      TEMP = 57.295*ACOS(TEMP)
      PRINT 1041, DET, TEMP
  170 DO 220 I = 1, NP
      P(I) = PHI(I) *STEP / E(I)
      TB(I) = TH(I) + P(I)
  220 CONTINUE
      PRINT 7000
 7000 FORMAT(30HOTEST POINT PARAMETER VALUES        )
      PRINT 2006, (TB(I), I = 1, NP)
      SUMB=0
      CALL MODEL(NPROB, TB, R, NOB, NP)
      DO 230 I=1,NOB
  230 SUMB=SUMB+R(I)*R(I)
      PRINT 1043, SUMB
      IF(SUMB - (1.0+EPS1)*SSQ) 662, 662, 663
  663 IF( AMIN1(TEMP-30.0, GA)) 665, 665, 664
  665 STEP=STEP/2.0
      INTCNT = INTCNT + 1
      IF(INTCNT - 36) 170, 2700, 2700
  664 GA=GA*FNU
      INTCNT = INTCNT + 1
      IF(INTCNT - 36) 666, 2700, 2700
  662 PRINT 1007
      DO 669 I=1,NP
  669 TH(I)=TB(I)
       CALL GASS60(1, NP, TH, TEMP, TEMP)
      PRINT 1040, GA, SUMB
      IF (EPS2) 229,229,225
  229 IF (EPS1) 270,270,265
  225 DO 240 I = 1, NP
      IF(ABS(P(I))/(1.E-20+ABS(TH(I)))-EPS2) 240, 240, 241
  241 IF (EPS1) 270,270,265
  240 CONTINUE
      PRINT 1009, EPS2
      GO TO 280
  265 IF(ABS(SUMB - SSQ) - EPS1*SSQ) 266, 266, 270
  266 PRINT 1010,EPS1
      GO TO 280
  270 SSQ=SUMB
      NIT=NIT+1
      IF(NIT-MIT) 100, 100, 280
 2700 PRINT 2710
 2710 FORMAT(//115H0**** THE SUM OF SQUARES CANNOT BE REDUCED TO THE SUM
     1OF SQUARES AT THE END OF THE LAST ITERATION - ITERATING STOPS   /)
                                                       END ITERATION

  280 PRINT 1011
      PRINT 2001, (R(I), I = 1, NOB)
      SSQ=SUMB
      IDF=NOB-NP
```

```
      I=0
       CALL MATIN(D, NP, P, I, DET)
      DO 7692 I=1,NP
      II = I + NP*(I-1)
 7692 E(I) = SQRT(D(II))
      DO 340 I=1,NP
      JI = I + NP*(I-1) - 1
      IJ = I + NP*(I-2)
      DO 340 J = I, NP
      JI = JI + 1
      A(JI) = D(JI) / (E(I)*E(J))
      IJ = IJ + NP
  340  A(IJ) = A(JI)
       CALL GASS60(3, NP, TEMP, TEMP, A)
      PRINT 1016
       CALL GASS60(1, NP, E, TEMP, TEMP)
      IF(IDF) 341, 410, 341
  341 SDEV = SSQ / IDF
      PRINT 1014, SDEV, IDF
       SDEV = SQRT(SDEV)
      DO 391 I=1,NP
      P(I)=TH(I)+2.0*E(I)*SDEV
  391 TB(I)=TH(I)-2.0*E(I)*SDEV
      PRINT 1039
       CALL GASS60(2, NP, TB, P, TEMP)
      CALL ACORR(R,AC,SDE,NOB,15)
      CALL PARTAL(AC,PP,15)
      PRINT 59
   59 FORMAT(1H1,47H AUTO AND PARTIAL CORRELATIONS OF THE RESIDUALS,//
     19X,1HI,14X,4HAUTO,14X,7HPARTIAL//)
      DO 58  I=1,15
   58 PRINT 57 , I,AC(I),PP(I)
   57 FORMAT (8X,I2,13X,F6.3,13X,F6.3)
      CL = 2.0/SQRT(FLOAT(NOB))
      PRINT 54,CL
   54 FORMAT(//50H APPROX. 95 PERCENT CONF. LIMIT ON CORRELATIONS = ,F5.
     13)
      CHI = 0.
      DO 56  I=1,15
   56 CHI = CHI+AC(I)*AC(I)
      CHI = CHI*FLOAT(NOB)
      PRINT 55, CHI
   55 FORMAT(/25H CHI-SQUARED STATISTIC = ,F6.2/65H BASED ON (15 - NO. O
     1F STOCHASTIC PARAMETERS) DEGREES OF FREEDOM /)
  410 CONTINUE
      RETURN
 99   PRINT 1034
      GO TO 410
 1000 FORMAT(38H1NON-LINEAR ESTIMATION, PROBLEM NUMBER   I3,// I5,
     1  14H OBSERVATIONS, I5, 11H PARAMETERS  I14, 17H SCRATCH REQUIRED)
 1001 FORMAT(/25H0INITIAL PARAMETER VALUES  )
 1003 FORMAT(/25H0INITIAL SUM OF SQUARES =   E12.4)
 1004 FORMAT(/////45X,13HITERATION NO.  I4)
 1007 FORMAT(/32H0PARAMETER VALUES VIA REGRESSION  )
 1009 FORMAT(/62H0ITERATION STOPS - RELATIVE CHANGE IN EACH PARAMETER LE
     1SS THAN    E12.4)
 1010 FORMAT(/52H0ITERATION STOPS - RELATIVE CHANGE IN SUM OF SQUARES LE
     1SS THAN    E12.4)
 1011 FORMAT(22H1FINAL RESIDUAL VALUES  )
 1012 FORMAT(////10H0RESIDUALS  )
 1014 FORMAT(//24H0VARIANCE OF RESIDUALS =     ,E12.4,1H,I4,
     120H DEGREES OF FREEDOM   )
 1015 FORMAT(////19H0CORRELATION MATRIX   )
 1016 FORMAT(////21H0NORMALIZING ELEMENTS   )
 1034 FORMAT(/16H0PARAMETER ERROR  )
 1039 FORMAT(/71H0INDIVIDUAL CONFIDENCE LIMITS FOR EACH PARAMETER (ON LI
     1NEAR HYPOTHESIS)   )
 1040 FORMAT(/9H0LAMBDA =E10.3,40X,33HSUM OF SQUARES AFTER REGRESSION =
     1E15.7)
 1041 FORMAT(14H DETERMINANT =  E12.4, 6X, 25H ANGLE IN SCALED COORD. =
     1   F5.2, 8HDEGREES   )
 1043 FORMAT(28H0TEST POINT SUM OF SQUARES =    E12.4)
 2001 FORMAT(/10E12.4)
 2006 FORMAT(10E12.4)
      END
```

```
      SUBROUTINE MATIN(A, NVAR, B, NB, DET)
      DIMENSION A(NVAR, 1), B(NVAR, 1)
      COMMON/GASPAP/DUMIES(7), PIVOTM
       PIVOTM = A(1,1)
      DET = 1.0
      DO 550 ICOL = 1, NVAR
       PIVOT = A(ICOL, ICOL)
      PIVOTM = AMIN1(PIVOT, PIVOTM)
       DET = PIVOT * DET

      DIVIDE PIVOT ROW BY PIVOT ELEMENT

       A(ICOL, ICOL) = 1.0

      PIVOT = AMAX1(PIVOT, 1.E-20)
       PIVOT = A(ICOL, ICOL)/PIVOT
      DO 350 L=1,NVAR
350    A(ICOL, L) = A(ICOL, L)*PIVOT
      IF(NB .EQ. 0) GO TO 371
      DO 370 L=1,NB
370    B(ICOL, L) = B(ICOL, L)*PIVOT

      REDUCE NON-PIVOT ROWS

371   DO 550 L1=1,NVAR
       IF(L1 .EQ. ICOL) GO TO 550
       T = A(L1, ICOL)
       A(L1, ICOL) = 0.
      DO 450 L=1,NVAR
450    A(L1, L) = A(L1, L) - A(ICOL, L)*T
      IF(NB .EQ. 0) GO TO 550
      DO 500 L=1,NB
500    B(L1, L) = B(L1, L)-B(ICOL,L)*T
550   CONTINUE
      RETURN
      END
       SUBROUTINE GASS60(ITYPE, NQ, A, B, C)
      DIMENSION A(NQ),B(NQ),C(NQ,NQ)
       NP = NQ
       NR = NP/10
       LOW = 1
       LUP = 10
10    IF( NR )15,20,30
15    RETURN
20    LUP=NP
      IF(LOW .GT. LUP) RETURN
30    PRINT 500, (J,J=LOW,LUP)
      GO TO (40,60,80),ITYPE
40    PRINT 600,(A(J),J=LOW,LUP)
      GO TO 100
60    PRINT 600, (B(J),J=LOW,LUP)
      GO TO 40
80    DO 90 I=LOW,LUP
90    PRINT 720,I,(C(J,I),J=LOW,I)
      LOW2=LUP+1
      IF(LOW2 .GT. NP) GO TO 100
      DO 95 I=LOW2,NP
95    PRINT 720,I,(C(J,I),J=LOW,LUP)
100    LOW = LOW + 10
       LUP = LUP + 10
       NR = NR - 1
       GO TO 10
500   FORMAT(/I8,9I12)
600   FORMAT(10E12.4)
720   FORMAT(1H0,I3,1X,F7.4,9F12.4)
 1    CONTINUE
      RETURN
      END

      SUBROUTINE ACORR(Z,AC,SDZ,N,NL)
      DIMENSION Z(1),AC(1)
      NL1 = NL+1
      TN = N
      SZ = 0.
      DO 13 I=1,N
 13   SZ=SZ+Z(I)
      ZBAR=SZ/TN
      DO 10 JJ=1,NL1
      J = JJ-1
            0.
```

```
      NN = N-J
      DO 11 I=1,NN
      K=I+J
   11 SZZ=SZZ+(Z(I)-ZBAR)*(Z(K)-ZBAR)
   10 AC(JJ) = SZZ/TN
      SDZ = SQRT(AC(1))
      VZ = AC(1)
      DO 12 J=1,NL
   12 AC(J) = AC(J+1)/VZ
      RETURN
      END

      SUBROUTINE PARTAL(R,PAUTO,M)
      DIMENSION R(1),PAUTO(1),PHAT(60),PHATN(60)
      PAUTO(1) = R(1)
      PHAT(1) = R(1)*(1.-R(2))/(1.-R(1)**2)
      PHAT(2) = (R(2)-R(1)**2)/(1.-R(1)**2)
      PAUTO(2) = PHAT(2)
      DO 4 I=3,M
      L = I-1
      FNUM = 0.
      DENOM = 0.
      DO 1 J=1,L
      K = I-J
      FNUM = PHAT(J)*R(K)+FNUM
    1 DENOM = DENOM+PHAT(J)*R(J)
      PHATN(I) = (R(I)-FNUM)/(1.-DENOM)
      PAUTO(I) = PHATN(I)
      DO 2 J=1,L
      K = I-J
    2 PHATN(J) = PHAT(J)-PHATN(I)*PHAT(K)
      DO 3 J=1,I
    3 PHAT(J) = PHATN(J)
    4 CONTINUE
      RETURN
      END
```

1 120 4

FLOW(IGAL/MIN) X	FILTERABLE RF TKN(MG/L) Y	LOADING(GM/DAY) Z	FILTERABLE EFF TKN(MG/L) W
1.00	22.20	145.45	1.00
1.00	23.10	151.35	0.70
1.00	25.60	167.73	0.60
1.00	22.70	148.73	1.00
1.00	20.40	133.66	0.70
1.00	24.90	163.14	0.90
2.00	20.70	271.25	1.30
2.00	13.30	174.28	2.70
2.00	12.70	166.42	3.30
2.00	11.40	149.39	3.10
2.00	9.00	117.94	1.70
2.00	8.80	115.32	1.10
2.00	15.10	197.87	2.90
2.00	23.90	313.19	3.30
2.00	24.30	318.43	7.20
2.00	22.50	294.84	8.00
2.00	21.90	286.98	9.40
2.00	20.90	273.87	10.10
1.00	21.60	141.52	11.70
1.00	35.10	229.98	12.20
1.00	33.90	222.11	13.10
1.00	28.70	188.04	13.70
1.00	27.20	178.21	14.00
1.00	35.50	232.60	11.40
2.00	37.60	495.33	12.30
2.00	14.30	187.39	10.90
2.00	14.60	191.32	7.20
2.00	11.20	146.76	4.90
2.00	12.90	169.04	2.60
2.00	14.10	184.77	1.60
1.00	16.40	107.45	3.40
1.00	18.40	120.56	5.90
1.00	16.10	105.49	8.30
1.00	13.90	91.07	9.40
1.00	9.90	64.86	9.20

TABLE F6 (Cont'd)

1.00	8.80	57.66	3.00
1.00	19.50	127.76	5.60
1.00	14.50	95.00	4.50
1.00	17.30	113.35	2.60
1.00	14.00	91.73	2.00
1.00	14.40	94.35	1.70
1.00	14.00	91.73	1.40
2.00	13.50	176.90	1.50
2.00	29.30	383.95	4.10
2.00	25.40	332.84	9.20
2.00	22.30	292.22	10.80
2.00	18.90	247.67	10.50
2.00	25.10	328.91	9.90
1.00	22.40	146.76	10.40
1.00	12.00	78.62	7.50
1.00	6.50	42.59	5.00
1.00	5.30	34.73	1.40
1.00	4.00	26.21	1.20
1.00	5.50	36.04	1.10
1.00	6.00	39.31	1.00
1.00	9.00	58.97	1.10
1.00	12.00	78.62	1.20
1.00	12.10	79.28	1.20
1.00	10.00	65.52	1.10
1.00	6.00	39.31	2.50
2.00	2.00	26.21	6.50
2.00	3.50	45.86	2.50
2.00	5.00	65.52	1.40
2.00	6.70	87.80	1.20
2.00	6.00	78.62	1.10
2.00	5.00	65.52	1.00
2.00	4.20	55.04	1.00
2.00	8.00	104.83	1.00
2.00	12.00	157.25	1.00
2.00	14.80	193.94	1.40
2.00	12.00	157.25	1.80
2.00	13.50	176.90	1.50
1.00	16.90	110.73	1.20
1.00	25.50	167.08	1.00
1.00	29.00	190.01	1.00
1.00	26.00	170.35	2.20
1.00	27.00	176.90	4.00
1.00	26.00	170.35	5.60
1.00	22.40	146.76	5.40
1.00	28.00	183.46	6.50
1.00	29.50	193.28	7.20
1.00	28.40	186.08	8.10
1.00	29.00	190.01	8.50
1.00	31.00	203.11	9.00
2.00	33.10	433.74	9.40
2.00	32.50	425.88	13.00
2.00	27.00	353.81	14.50
2.00	19.20	251.60	14.80
2.00	26.00	340.70	15.50
2.00	30.50	399.67	16.00
2.00	31.50	412.78	18.40
2.00	21.50	281.74	16.50
2.00	16.00	209.66	14.00
2.00	14.50	190.01	10.00
2.00	13.50	176.90	7.00
2.00	20.00	262.08	7.00
1.00	13.00	85.18	9.90
1.00	12.40	81.24	17.10
1.00	11.90	77.97	8.60
1.00	10.50	68.80	2.10
1.00	12.00	78.62	1.00
1.00	10.20	66.83	0.90
2.00	10.80	141.52	0.90
2.00	17.70	231.94	0.80
2.00	15.90	208.35	3.30
2.00	16.20	212.28	4.70
2.00	10.90	142.83	6.20
2.00	11.10	145.45	6.70
1.00	22.70	148.73	7.20
1.00	18.70	122.52	8.80

TABLE F6 (Cont'd)

1.00	14.20	93.04	8.60
1.00	13.90	91.07	8.20
1.00	13.60	39.11	7.30
1.00	11.60	76.00	6.60
2.00	11.40	136.28	5.80
2.00	15.90	208.35	5.70
2.00	15.70	205.73	7.50
2.00	14.50	190.01	8.10
2.00	9.40	123.18	7.20
2.00	9.80	128.42	5.00

Z MEAN	W MEAN
166.677	5.834

NON-LINEAR ESTIMATION, PROBLEM NUMBER 1

120 OBSERVATIONS, 4 PARAMETERS 636 SCRATCH REQUIRED

INITIAL PARAMETER VALUES

1	2	3	4
0.7600E+00	0.1390E-01	0.1363E+01	0.3200E+00

INITIAL SUM OF SQUARES = 0.2962E+03

ITERATION NO. 1

DETERMINANT = 0.2289E+00 ANGLE IN SCALED COORD. =37.19DEGREES

TEST POINT PARAMETER VALUES
0.7815E+00 0.1066E-01 0.1356E+01 0.3217E+00

TEST POINT SUM OF SQUARES = 0.2925E+03

PARAMETER VALUES VIA REGRESSION

1	2	3	4
0.7815E+00	0.1066E-01	0.1356E+01	0.3217E+00

LAMBDA = 0.100E-02 SUM OF SQUARES

AFTER REGRESSION = 0.2924856E+03

ITERATION NO. 2

DETERMINANT = 0.2120E+00 ANGLE IN SCALED COORD. =49.00DEGREES

TEST POINT PARAMETER VALUES
0.7899E+00 0.1066E-01 0.1065E+01 0.3353E+00

TEST POINT SUM OF SQUARES = 0.2924E+03

PARAMETER VALUES VIA REGRESSION

1	2	3	4
0.7899E+00	0.1066E-01	0.1065E+01	0.3353E+00

LAMBDA = 0.100E-03 SUM OF SQUARES

=

TABLE F6 (Cont'd)

ITERATION NO. 3

DETERMINANT = 0.2111E+00 ANGLE IN SCALED COORD. =39.90DEGREES

TEST POINT PARAMETER VALUES
0.7863E+00 0.1062E-01 0.1366E+01 0.3355E+00

TEST POINT SUM OF SQUARES = 0.2924E+03

PARAMETER VALUES VIA REGRESSION

1	2	3	4
0.7863E+00	0.1062E-01	0.1366E+01	0.3355E+00

LAMBDA = 0.100E-04 SUM OF SQUARES
AFTER REGRESSION = 0.2924019E+03

ITERATION NO. 4

DETERMINANT = 0.2109E+00 ANGLE IN SCALED COORD. =49.56DEGREES

TEST POINT PARAMETER VALUES
0.7864E+00 0.1062E-01 0.1366E+01 0.3358E+00

TEST POINT SUM OF SQUARES = 0.2924E+03

PARAMETER VALUES VIA REGRESSION

1	2	3	4
0.7864E+00	0.1062E-01	0.1366E+01	0.3358E+00

LAMBDA = 0.100E-05 SUM OF SQUARES
AFTER REGRESSION = 0.2924018E+03

ITERATION STOPS - RELATIVE CHANGE IN EACH PARAMETER LESS THAN 0.1000E-02

FINAL RESIDUAL VALUES

0.0000E+00	0.0000E+00	0.0000E+00	-0.3706E+00	-0.7699E+00	-0.2332E+00
-0.6024E+00	-0.6801E+00	-0.1696E+00	-0.9410E+00	-0.1805E+01	-0.7151E+00
0.1195E+01	-0.1365E+01	0.1771E+01	-0.1237E+01	0.6870E+00	0.1422E-01
0.1355E+01	0.1083E+01	0.1218E+01	0.1506E+01	0.1804E+01	-0.9048E+00
0.2308E+01	-0.3504E+01	-0.1388E+01	-0.1516E+01	-0.2015E+01	-0.1625E+01
0.4848E+00	0.1663E+01	0.1666E+01	0.1367E+01	0.9866E+00	0.6848E+00
-0.4238E+00	-0.3872E-01	-0.9321E+00	-0.1885E+00	-0.1785E+00	-0.4555E+00
-0.7683E-01	0.1419E+01	0.1852E+01	-0.4655E-01	-0.3677E+00	0.2687E-01
-0.3241E-01	-0.1518E+01	-0.6971E+00	-0.2296E+01	0.6633E+00	-0.1747E+00
-0.2055E+00	0.9772E-01	-0.4669E-01	-0.1996E+00	-0.1835E+00	0.1471E+01
0.4183E+01	-0.3533E+01	0.7713E+00	0.3020E+00	-0.1159E+00	-0.2428E-01
0.1243E+00	0.1460E+00	-0.4113E+00	-0.4051E+00	-0.7451E+00	-0.9122E+00
-0.1202E+01	-0.4768E+00	-0.1226E+01	-0.1405E+00	0.6105E+00	-0.9791E-01
-0.9722E-01	[illegible]4E+01	0.3015E+00	0.8466E+00	0.5965E+00	0.8723E+00

TABLE F6 (Cont'd)

0.7261E+00	0.1637E+01	0.1699E+01	0.5122E+00	0.2034E+01	0.5440E+00
0.2335E+01	-0.1988E+01	-0.3344E+00	-0.2068E+01	-0.1579E+01	0.5000E+00
0.1587E+01	0.7951E+01	-0.7740E+01	-0.2527E+01	0.7058E+00	-0.3968E+00
-0.3846E+00	-0.1263E+01	0.6343E+00	-0.1245E+00	0.4766E+00	0.5203E+00
0.6919E+00	0.1934E+01	0.7085E+00	0.8937E+00	0.6124E+00	0.7559E+00
0.5912E+00	0.4783E+00	0.1584E+01	0.4413E+00	-0.4464E+00	-0.9111E+00

CORRELATION MATRIX

	1	2	3	4
1	1.0000			
2	-0.6074	1.0000		
3	0.1185	-0.1492	1.0000	
4	0.1299	-0.0645	0.8069	1.0000

NORMALIZING ELEMENTS

1	2	3	4
0.3334E-01	0.1239E-02	0.5590E-01	0.5527E-01

VARIANCE OF RESIDUALS = 0.2521E+01, 116 DEGREES OF FREEDOM

INDIVIDUAL CONFIDENCE LIMITS FOR EACH PARAMETER (ON LINEAR HYPOTHESIS)

1	2	3	4
0.8922E+00	0.1455E-01	0.1243E+01	0.5113E+00
0.6805E+00	0.6683E-02	0.8883E+00	0.1603E+00

AUTO AND PARTIAL CORRELATIONS OF THE RESIDUALS

I	AUTO	PARTIAL
1	-0.029	-0.029
2	0.037	0.036
3	-0.008	-0.006
4	-0.021	-0.022
5	0.004	0.003
6	-0.177	-0.176
7	0.043	0.034
8	-0.102	-0.091
9	-0.084	-0.097
10	-0.034	-0.041
11	-0.103	-0.108
12	-0.100	-0.062
13	-0.032	-0.018
14	-0.065	-0.119
15	-0.072	-0.121

APPROX. 95 PERCENT CONF. LIMIT ON CORRELATIONS = 0.183

CHI-SQUARED STATISTIC = 18.28
BASED ON (15 - NO. OF STOCHASTIC PARAMETERS) DEGREES OF FREEDOM

with k+1 -(r+s+1) degrees of freedom where (r+s+1) is the number of parameters in the transfer function model. Applying these methods led to the final form of the TF-N models (Table 14).

Effect of Altering Sampling Interval on TF-N Models

The optimal choice of the sampling interval is an important consideration when dealing with process control. In this regard McGregor (1976) has presented a procedure whereby given a discrete dynamic-stochastic model based on a given sampling interval, the alteration in the form and the parameters of the model can be determined for a new sampling interval. The approach is illustrated below for the linear dynamic-stochastic model developed to describe the effluent filterable TKN from the combined sludge system (Table 14) and leads to the new model form given in Table 15. A similar procedure was employed for determination of the new separate sludge effluent filterable TKN model.

Combined-sludge effluent TKN TF-N model for new sampling interval

The original TF-N model was developed on the basis of a two hour sampling interval. In order to utilise the model for forecasting purposes, with respect to experiments D3 and D4, the form of the model and the parameters must be altered to account for a sampling interval of three hours. The stochastic portion of the original TF-N model is given by the autoregressive model

$$(1-1.066\beta + 0.336\,\beta^2)\,N_t = a_t \qquad \text{..........(50)}$$

with autoregressive parameters

$$\phi 1_{2hr} = 1.066$$

$$\phi 1_{2hr} = -0.336$$

by calculating the reciprocal of the roots of

$$(1-1.066\beta + 0.336\,\beta^2) = 0 \qquad \text{..........(51)}$$

given by G1 and G2 the new parameter values can be determined from

$$\phi 1_{3hr} = G_1^{\,h} + G_2^{\,h} \qquad \text{..........(52)}$$

$$\phi 1_{3hr} = G_1^{\,h} G_2^{\,h} \qquad \text{..........(53)}$$

where h is the number of times the basic sampling interval is increased (h = 3/2). By carrying out this procedure the new stochastic model was determined to be

$$(1-0.7254\beta + .1949\ \beta^2)\ N_t = a_t \qquad \text{..........(54)}$$

The original transfer function model is also affected by the change in sampling interval. By assuming that the discrete transfer function model is a discretely coincident representation of an underlying continuous process of corresponding order, one can show using modified Z - transforms how the parameters of the model will change with sampling interval (Box and Jenkins, 1970 d). The original TF model is first order in nature and of the form

$$Y_t = \frac{0.001}{1-0.786\beta}\ X_{1_{t-1}} \qquad \text{..........(55)}$$

with parameters

$$\delta_{2hr} = 0.786$$

$$\omega_{2hr} = 0.011$$

For the new sampling interval the parameter values can be determined from

$$\delta_{3hr} = \delta_{2hr}^{\ h} \qquad \text{..........(56)}$$

$$\omega_{3hr} = \frac{\omega_{2hr}(1-\delta_{2hr}^{\ h})}{1-\delta_{2hr}} \qquad \text{..........(57)}$$

These calculations lead to the new TF model given by

$$Y_t = \frac{0.0156}{1-0.697\beta}\ X_{1_{t-1}} \qquad \text{..........(58)}$$

Forecasting and Simulation Procedures

Forecasting system response to impulse forcings

The forecasted effluent values in experiments D3 and D4 were determined by using the "difference" forms of the TF-N models (three-hour interval) together with the observed values of the input variable, filterable TKN loading (X_1). Details of the computation methods are outlined elsewhere (Box and Jenkins, 1970C). To briefly illustrate the procedure reference will be made to experiment D3 and the combined sludge system results (Figure 26).

In order to forecast the initial effluent TKN results, past values of the influent variable (X_1) as well as the effluent TKN are necessary. By beginning the forecast following the baseline day of the experiment these values were then available. The form of the TF-N model forecast equation also requires past values for the residuals (a_t's), the difference between the observed and model results. These residuals were determined by fitting the TF-N model to the baseline day influent conditions and thereby determining model effluent values. Comparing the observed and model results allows determination of the residuals for the baseline day of the experiment. A computer program was written to carry out the above calculations and determine the forecast results (Table F7).

Predicting responses to simulated input conditions

In order to utilize the transfer function (TF) and the TF-N models to predict the response of the combined and separate sludge systems to natural input conditions, the baseline day influent variations encountered in experiments D3 and D6 were simulated. Each simulation involved approximating the three-hour sampling results as a continuous record and then picking off discrete two-hour interval results. These results were used in conjunction with the TF and TF-N models (two-hour interval) to predict effluent results. As in the case with forecasting, the initial TF results are influenced by past values of the influent

```
TRANSFER FUNCTION - NOISE MODEL FORECASTING PROGRAM - RUN 03
FILTERABLE EFFLUENT TKN , SSC SLUDGE SYSTEM

      DIMENSION A(5,50),X(50),Y(50),T(50)
      COMMON Z(50),W(50),TH(20),R(50)
      CALL FORMS(1)
      DATA NOB/17/,NAB/7/,NIB/11/
      NUB=NAB+2

      IDENTIFY INPUT
      X = FLOW(GAL/MIN)
      Y = FILTERABLE RAW FEED TKN(MG/L)
      W = FILTERABLE EFFLUENT TKN(MG/L)
      NP = NUMBER OF TH VALUES
      R = TIME(HRS)

      READ 4,IX,IY,IW,NP,IR
    4 FORMAT(5I2)
      PRINT 6,IX,IY,IW,NP,IR
    6 FORMAT(1H1,5I2)

      AZ = MEAN LOADING FROM EXPERIMENT D5 (GM/DAY)
      AW = MEAN FILTERABLE EFFLUENT TKN FROM EXPERIMENT D5 (MG/L)

      READ 82,AZ,AW
   82 FORMAT(10X,F7.3,2X,F5.3)
      PRINT 84
   84 FORMAT(/////,19X,30HMEAN VALUES FROM EXPERIMENT D5,//)
      PRINT 86,AZ
   86 FORMAT(20X,19HLOADING (GM/DAY) = ,F7.3,/)
      PRINT 87,AW
   87 FORMAT(20X,31HFILTERABLE EFFLUENT A (MG/L) = ,F5.3,////////)

      READ IN MODEL PARAMETERS

      READ 2,(TH(I),I=1,NP)
    2 FORMAT(F6.4)
      PRINT 3
    3 FORMAT(3X,28HINPUT MODEL PARAMETER VALUES)
      DO 98 J=1,NP
      PRINT 97,TH(J),J
   97 FORMAT(10X,F10.4, 2X, 3HTH(,I2,1H))
   98 CONTINUE

      READ IN DATA

      READ 1,((A(I,J),I=1,5),J=1,NOB)
    1 FORMAT(3X,F4.1,2X,F3.1,F6.1,F6.1,F7.1)
      PRINT 20
   20 FORMAT(///,8X,1HX,15X,1HY,14X,1HZ,14X,1HW,12X,1HR)
      PRINT 23
   23 FORMAT(/,19X,10HFILTERABLE,22X,10HFILTERABLE)
      PRINT 21
   21 FORMAT(2X,14HFLOW(IGAL/MIN),2X,12HRF TKN(MG/L),2X,
     115HLOADING(GM/DAY),2X,13HEFF TKN(MG/L),2X,9HTIME(HRS))
      DO 5 K=1,NOB
      X(K)=A(IX,K)
      Y(K)=A(IY,K)
      W(K)=A(IW,K)
      R(K)=A(IR,K)
      Z(K)=(X(K)*Y(K))*6.552
      PRINT 10,(X(K),Y(K),Z(K),W(K),R(K))
   10 FORMAT(7X,F4.2,6X,F10.2,5X,F10.2,5X,F10.2,4X,F10.2)
    5 CONTINUE
      DO 81 K=1,NOB
      Z(K)=Z(K)-AZ
      W(K)=W(K)-AW
   81 CONTINUE

      CALCULATION OF RESIDUALS FOR FIRST 9 VALUES (24 HR PERIOD)

      T(1)=0.0
      T(2)=0.0
      T(3)=0.0
```

```
      PRINT 14
   14 FORMAT(///,6X,9HRESIDUALS,//)
      DO 88 I=1,3
      PRINT 89,I,T(I)
   89 FORMAT(5X,2HT(,I2,1H),F6.2)
   88 CONTINUE
      DO 100 I=4,NOB
      T(I)=(TH(1)*T(I-1))+W(I)-(TH(2)*W(I-1))
     1+(TH(3)*W(I-2))-(TH(1)*W(I-1))+(TH(2)*TH(1)*W(I-2))
     1-(TH(3)*TH(1)*W(I-3))-(TH(4)*Z(I-1))
     1+(TH(2)*TH(4)*Z(I-2))-(TH(3)*TH(4)*Z(I-3))
      PRINT 11,I,T(I)
   11 FORMAT(5X,2HT(,I2,1H),F6.2)
      TO=T(NOB)*(-0.597)
  100 CONTINUE

      CALL FORECAST CALCULATION SUBROUTINE FROT .

      CALL FROT(NOB,NIB,TO,NAB,AW)
      END




      SUBROUTINE FROT(NOB,NIB,T,NAB,AW) .

      FORECAST CALCULATION

      DIMENSION S(50),TA(50),TD(50),WT(50),WS(10)
      COMMON Z(50),W(50),TH(20),R(50)
      I=0
      DO 20  J=NAB,NOB
      I=I+1
      S(I)=Z(J)
   20 CONTINUE
      TA(1)=W(NAB)
      TA(2)=W(NAB+1)
      TA(3)=W(NAB+2)
      PRINT 30
   30 FORMAT(///////,5X,45HYN = FORECASTED EFFLUENT FILTERABLE TKN VALUE
     1,/,5X,36HY = OBSERVED EFFLUENT FILTERABLE TKN,/,5X,55HBARY = MEAN
     2EFFLUENT FILTERABLE TKN VALUE EXPERIMENT 05,////////)
      PRINT 14
   14 FORMAT(18X,8HFORECAST,16X,8HOBSERVED,/)
      PRINT 13
   13 FORMAT(14X,2HYN,3X,7HYN-BARY,15X,6HY-BARY,8X,1HY,3X,9HTIME(HRS),/)
      LL=NAB+2
      DO 11  L=NAB,LL
      WS(L)=W(L)+AW
      PRINT 12,WS(L),W(L),W(L),WS(L),R(L)
   12 FORMAT(12X,F6.2,2X,F6.2,16X,F6.2,5X,F6.2,5X,F4.1)
   11 CONTINUE
      K=NAB+2
      N=0

      FORECASTING NEXT 8 VALUES

      DO 100 J=4,NIB
      TA(J)=(TH(2)*TA(J-1))-(TH(3)*TA(J-2))+(TH(1)*TA(J-1))
     1-(TH(2)*TH(1)*TA(J-2))+(TH(3)*TH(1)*TA(J-3))
     1+(TH(4)*S(J-1))-(TH(2)*TH(4)*S(J-2))+(TH(3)*TH(4)*S(J-3))
      K=K+1
      IF(J.GT.4) GO TO 7
      IF(J.EQ.4) GO TO 5
    5 CONTINUE
      TA(4)=TA(4)+T
    7 N=N+1
      WT(K)=W(K)+AW
      TD(J)=TA(J)+AW
  100 PRINT 6,TD(J),TA(J),N,W(K),WT(K),R(K)
    6 FORMAT(12X,F6.2,2X,F6.2,5X,4HT=  ,I2,5X,F6.2,5X,F6.2,5X,F4.1)
      RETURN
      END
        FINIS
X,LGO.
```

TABLE F7 (Cont'd)

MEAN VALUES FROM EXPERIMENT D5

LOADING (GM/DAY) = 166.677

FILTERABLE EFFLUENT A (MG/L) = 5.850

INPUT MODEL PARAMETER VALUES

0.6970	TH(1)
0.7254	TH(2)
0.1950	TH(3)
0.0156	TH(4)

X FLOW(IGAL/MIN)	Y FILTERABLE RF TKN(MG/L)	Z LOADING(GM/DAY)	W FILTERABLE EFF TKN(MG/L)	R TIME(HRS)
1.00	5.70	37.35	1.70	0.00
1.00	15.70	102.87	1.00	3.00
1.00	10.30	67.49	1.20	6.00
1.00	9.10	59.62	1.10	9.00
1.00	7.20	47.17	1.20	12.00
1.00	7.10	46.52	1.00	15.00
1.00	7.80	51.11	1.10	18.00
1.00	4.30	28.17	0.90	21.00
2.00	4.10	53.73	1.30	24.00
2.00	17.20	225.39	0.90	27.00
2.00	15.50	203.11	3.70	30.00
2.00	11.10	145.45	4.30	33.00
1.00	9.60	62.90	3.00	36.00
1.00	9.00	58.97	1.20	39.00
1.00	9.30	60.93	0.70	42.00
1.00	6.20	40.62	0.60	45.00
1.00	5.50	36.04	1.00	48.00

RESIDUALS

T(1)	0.00
T(2)	0.00
T(3)	0.00
T(4)	0.25
T(5)	0.42
T(6)	0.32
T(7)	0.61
T(8)	0.27
T(9)	1.23

YN = FORECASTED EFFLUENT FILTERABLE TKN VALUE
Y = OBSERVED EFFLUENT FILTERABLE TKN
BARY = MEAN EFFLUENT FILTERABLE TKN VALUE EXPERIMENT D5

TABLE F7 (Cont'd)

FORECAST YN	FORECAST YN-BARY		OBSERVED Y-BARY	Y	TIME (HRS)
1.10	-4.75		-4.75	1.10	18.0
0.90	-4.95		-4.95	0.90	21.0
1.30	-4.55		-4.55	1.30	24.0
0.80	-5.05	T= 1	-4.95	0.90	27.0
2.95	-2.90	T= 2	-2.15	3.70	30.0
4.21	-1.64	T= 3	-1.55	4.30	33.0
4.30	-1.55	T= 4	-2.85	3.00	36.0
3.13	-2.72	T= 5	-4.65	1.20	39.0
2.27	-3.58	T= 6	-5.15	0.70	42.0
1.71	-4.14	T= 7	-5.25	0.60	45.0
1.00	-4.85	T= 8	-4.85	1.00	48.0

variables and effluent results but in this case these values are unknown. This problem was overcome by assuming the influent variation over the 24 hour period was repeatable. This procedure, together with assuming initial values for the past effluent results, allowed the simulation to be carried out. By extending the computation for a number of repeatable influent sequences the results stabilized to the final predicted effluent sequence, independent of the initially assumed effluent values. In determining the TF-N model results, in addition to the requirement for past effluent and influent values a series of values for the white noise sequence (a_t's) is required. This series was generated using a random numbers routine. The mean of the series was specified as zero and the standard deviation was set equal to the standard deviation of the residuals determined during the TF-N model development (experiment D5). The computer program developed to carry out the above computations and generate the stable predicted effluent results is illustrated in Table F8. for a particular example.

TABLE F8 PROGRAM TO DETERMINE TRANSFER FUNCTION-NOISE MODEL PREDICTIONS FOR SIMULATED INPUT CONDITIONS

```
      DIMENSION TY(100),TT(100),TX(100),KA(100),V(100),VX(100)
C
C     TRANSFER FUNCTION - NOISE MODEL SIMULATION PROGRAM
C     BASELINE 06 INPUT CONDITIONS
C     COMPUTATIONS FOR SSC SLUDGE SYSTEM - FILTERABLE EFFLUENT TKN (2 HR MODEL
C     (FIG. 35)
C     IDENTIFY PARAMETERS
C     TY = PREDICTED FILTERABLE EFFLUENT TKN(MG/L) MINUS MEAN
C     VX = RESIDUAL RANDOM NUMBER ,OBTAINED FROM C.C.I.W. COMPUTER LIBRARY
C     SUBROUTINE GAUSS. THIS SUBROUTINE COMPUTES A NORMALLY DISTRIBUTED RANDO
C     NUMBER WITH A GIVEN MEAN OF 0.0 AND A STANDARD DEVIATION OF 1.5877
C     TX = RAW SEWAGE FILTERABLE TKN LOADING(GM/DAY)
C     TT = PREDICTED FILTERABLE EFFLUENT TKN(MG/L)
C     KA = HOUR OF PREDICTED FILTERABLE EFFLUENT TKN
C
      DO 4 J=1,99
      READ 1,TX(J),KA(J)
    1 FORMAT(2X,F8.3,2X,I4)
    4 CONTINUE
      PRINT 10
   10 FORMAT(10X,42HRAW SEWAGE FILTERABLE TKN LOADING SEQUENCE,//)
      DO 12 J=1,12
      PRINT 11,TX(J),KA(J)
   11 FORMAT(19X,F8.3,2X,I4)
   12 CONTINUE
      DO 102 I=1,97
      READ 5,V(I)
    5 FORMAT(2X,F5.2)
  102 CONTINUE
      DO 101 I=1,97
      VX(I+2)=V(I)
  101 CONTINUE
      PRINT 15
   15 FORMAT(////,10X,36HRANDOM NUMBER SEQUENCE FOR RESIDUALS,//)
      DO 13 J=3,14
      PRINT 14,VX(J),J
   14 FORMAT(10X,F5.2,2X,3HVX(,I2,1H))
   13 CONTINUE
      PRINT 16
   16 FORMAT(////,10X,33HPREDICTED FILTERABLE EFFLUENT TKN,//)
C
C     INITIAL ESTIMATE OF PREDICTED FILTERABLE EFFLUENT(MG/L) MINUS MEAN
C
      TY(1)=3.05
      TY(2)=2.65
      TY(3)=1.15
C
      DO 100 J=4,99
      TY(J)=VX(J)-(0.786*VX(J-1))+(1.066*TY(J-1))-(0.336*TY(J-2))
     1+(0.786*TY(J-1))-(1.066*0.786*TY(J-2))+(0.336*0.786*TY(J-3))
     1+(0.011*TX(J-1))-(1.066*0.011*TX(J-2))+(0.336*0.011*TX(J-3))
      TT(J)=TY(J)+5.85
  100 CONTINUE
      PRINT 19
   19 FORMAT(6X,3HTKN,5X,2HHR,8X,3HTKN,4X,2HHR//)
      PRINT 18,(TT(J),KA(J),J=4,99)
   18 FORMAT(2(F10.2,3X,I4)/)
      END
```

RAW SEWAGE FILTERABLE TKN LOADING SEQUENCE

-25.677	300
-34.677	500
-46.677	700
-81.677	900
-32.677	1100

TABLE F8 (Cont'd)

30.323	1500
33.323	1700
23.323	1900
11.323	2100
13.323	2300
3.323	100

RANDOM NUMBER SEQUENCE FOR RESIDUALS

-0.47	VX(3)
-0.52	VX(4)
-1.64	VX(5)
-0.96	VX(6)
-0.73	VX(7)
3.46	VX(8)
-1.55	VX(9)
0.44	VX(10)
0.88	VX(11)
-1.54	VX(12)
-0.36	VX(13)
-0.50	VX(14)

PREDICTED FILTERABLE EFFLUENT TKN

TKN	HR	TKN	HR
5.32	900	2.51	1100
2.37	1300	3.22	1500
7.91	1700	7.41	1900
7.37	2100	7.88	2300
6.11	100	5.12	300
4.24	500	3.65	700
3.10	900	1.23	1100
1.70	1300	2.91	1500
7.77	1700	7.36	1900
7.34	2100	7.86	2300
6.08	100	5.69	300
4.22	500	3.63	700
3.12	900	1.24	1100
1.71	1300	2.92	1500
7.78	1700	7.36	1900
7.34	2100	7.86	2300
6.09	100	5.10	300
4.22	500	3.63	700
3.10	900	1.23	1100
1.70	1300	2.91	1500
7.77	1700	7.36	1900
7.34	2100	7.86	2300
6.08	100	5.09	300
4.22	500	3.63	700

APPENDIX G

Abbreviations and Symbols

Abbreviations and symbols appearing in this report, not commonly used or not defined within the report are listed on the following pages.

They are arranged according to where they appear in the report.

Abbreviations and symbols appearing in "Data Listing" Appendix B:

MON	- month
OPERATING MODE	- reactor system under operation; 1 - SSC 2 - TSS 3 - TSC 4 - FSC
SSC	- single-stage combined sludge system
TSS	- two-stage separate sludge system
TSC	- two-stage combined sludge system
FSC	- five-stage combined sludge system
SSRT	- system solids retention time (days)
TEMP	- temperature (^{o}C)
SS	- suspended solids (mg/l)
HACH NH_3N	- ammonia - nitrogen determination by HACH Chemical Co. method
ALK	- alkalinity as $CaCO_3$ (mg/l)
APPROX	- approximately
MLSS	- mixed liquor suspended solids (mg/l)
VSS	- mixed liquor volatile suspended solids (mg/l)
WASTE CONC	- concentration of solids wasted (mg/l)
IGAL WASTE	- imperial gallons of solids wasted
30 MIN SET	- settled volume of 1000 ml of mixed liquor after 30 min. (ml)

DO	- dissolved oxygen (mg/l)
OUR	- mixed liquor oxygen uptake rate ($mg\ O_2/g\text{-}hr$)
REACTOR	- aeration tank of reactor system referred to; A - SSC system A1- first-stage of TSC system A2- second-stage of TSC system B1- first-stage of TSS system or FSC system B2- second-stage of TSS system B3- third-stage of FSC system B5- fifth-stage of FSC system
RF	- raw sewage
-0900	- time sample taken
-GAM	- grab sample taken in AM
-GPM	- grab sample taken in PM
-C	- composite of 24 hr. by hr. samples
-C1	- composite of 0900, 1000, and 1100 hour samples
-C2	- composite of 1200, 1300, and 1400 hour samples
-C3	- composite of 1500, 1600, and 1700 hour samples
-C4	- composite of 1800, 1900, and 2000 hour samples
-C5	- composite of 2100, 2200, and 2300 hour samples
-C6	- composite of 2400, 0100, and 0200 hour samples
-C7	- composite of 0300, 0400, and 0500 hour samples
-C8	- composite of 0600, 0700, and 0800 hour samples
-CC1	- composite of samples from 0900 to 1600 hr.

-CC2	- composite of samples from 1700 to 2400 hours
-CC3	- composite of samples from 0100 to 0800 hours
EA1	- sample from aeration tank A1
EA2	- clarified effluent sample from TSC system
EA	- clarified effluent sample from SSC system
EB1	- clarified effluent sample from first-stage of TSS system
EB2	- clarified effluent sample from second-stage of TSS system
EB*	- clarified effluent from FSC system
MLA	- mixed liquor sample from aeration tank A
MLA1	- mixed liquor sample from aeration tank A1
MLA2	- mixed liquor sample from aeration tank A2
MLB1	- mixed liquor sample from aeration tank B1
MLB2	- mixed liquor sample from aeration tank B2
MLB1*	- mixed liquor sample from first-stage of FSC system
MLB3*	- mixed liquor sample from third-stage of FSC system
MLB5*	- mixed liquor sample from fifth-stage of FSC system
COD	- chemical oxygen demand (mg/l)
BOD	- five-day, $20^{o}C$ biochemical oxygen demand (mg/l)
TKN	- total kjeldahl nitrogen (mg/l)

FOC	- filtered organic carbon (mg/l)
NH_4N	- ammonia plus ammonium-nitrogen (mg/l)
NO_3N	- nitrate-nitrogen (mg/l)
NO_2N	- nitrite-nitrogen (mg/l)

Other abbreviations and symbols appearing throughout the report:

SRT	- solids retention time (days)
PSS-1	- pseudo "steady-state" run number 1
D/uL	- dimensionless dispersion number
u	- velocity (L/T)
L	- length (L)
D	- dispersion coefficient (L^2/T)
ANOVA	- analysis of variance
D-1	- dynamic or non-steady run number 1
HRT	- hydraulic residence time