ADVANCED INDUSTRIAL AERATION DISCLAIMER ON THE MOTOR USED FOR GSEE REPORT

The GSEE report that follows includes the test results of four AIA nozzles. The testing shows that AIA nozzles are very linear in performance with a high SOTR of 11%. The low SAE value is the result of using 1 5hp submersible pump to test all four nozzles at a particular motive flow by restricting the pump discharge. The testing pump in particular had a draw of 26.5 amps. Pumps used in our installations (5hp) use between 17 and 18 amps. Trying to recalculate the true SAE wire hp using the different restricted flows did not work and penalized us.

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EVALUATION OF

OXYGEN TRANSFER CAPABILITIES:

ADVANCED INDUSTRIAL AERATION ½" & ¾" AIR INJECTION NOZZLES

BY

GSEE, INC.
LAVERGNE, TN.

JUNE, 2004

GSEE
ENVIRONMENTAL CONSULTANTS

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1. INTRODUCTION

Advanced Industrial Aeration, Inc. retained GSEE Inc. to perform tests on the ¾" and ½" AIA air injection nozzles. These tests were conducted the week of June 3, 2004.

The following were present during the testing:

Jim Terry	Advanced Industrial Aeration, Inc.
Linda Terry	Advanced Industrial Aeration, Inc.
Michael Hicks	GSEE, Inc.

Oxygen transfer is determined using the ASCE clean water non-steady state test procedures. The ASCE standard requires a regression analysis on the data from _each_ sample location and then averages the obtained results.

Test results are reported at standard conditions of 20°C liquid temperature, one (1) atmosphere barometric pressure, zero (0) dissolved oxygen, and alpha (α) and beta (ß) equal to 1.0 (clean tap water). All test results have been calculated using both the ASCE linear and non-linear regression analysis methods for the determination of the mass transfer coefficient K_La_T, the steady-state D.O. saturation value C^*_∞, and the D.O. concentration at time zero C_0.

2. DESCRIPTION OF THE TEST FACILITY

All testing was performed in a 6.5 foot by 2.0 foot tank having a water depth of 5-feet. The airflow was measured using Dwyer Anemometers. A 5 HP submersible pump provided liquid flow rates from 50 to 125 GPM. Atmospheric air is aspirated by the vacuum developed by the liquid flow through the AIA air injection nozzle .Figure 2-1 is a photo showing the aeration system in operation.

Figure 2-1 Equipment Arrangement

3. TEST PROCEDURES

Before testing, the aeration basin was cleaned and filled with potable water.

Two (2) YSI dissolved oxygen meters and probes were placed in the test basin and later used to monitor the dissolved oxygen concentration during each test. The two probes were located as follows:

A ¼ of the basin liquid depth
B ½ of the basin liquid depth

Overall test procedures include:

After filling the test basin with tap water, add enough cobalt chloride catalyst to obtain a concentration of cobaltous ion less than 0.1 mg/l. Dissolve the catalyst into the basin contents by running the aeration system a minimum of thirty minutes before testing.

Add enough (150-200% of stoichiometric) sodium sulfite to deoxygenate the tap water in the basin to start each test. Monitor the dissolved oxygen concentration as it depletes then starts to rise, using the *in-situ* dissolved oxygen probes. Measure the water temperature using the D.O. Probe thermisters.

With the aeration system operating at the specified liquid depth, start monitoring as the oxygen concentration increases. Collect data to cover a range of dissolved oxygen concentrations from 1.0 mg/l to 98% of saturation, obtaining a minimum of 80 data points for each probe.

I. The **general test procedures** are:

1. Thoroughly clean the aeration basin before testing and fill with tap water to the desired liquid depth.
2. Operate the aeration system in potable water at the test airflow rate and operating liquid depth for 30 minutes before testing to obtain temperature and mixing equilibrium. Record liquid temperature a minimum of two times during each test run. Maintain the required air flow rate during testing by monitoring the air flow meter. Monitor operating air pressure via a mercury manometer. Measure operating line temperature.
3. Install 2 dissolved oxygen probes with integral stirrers at locations in the test tank as required.
4. Use Cobalt Chloride ($CoCl_2 * 6H_2O$) as a catalyst at a concentration of 0.1 mg/l.
5. Use anhydrous sodium sulfite technical grade (Na_2SO_3) to deoxygenate the test liquid. Add sufficient sulfite solution (150 - 200 % of stoichiometric) before each test run to decrease the oxygen concentration to zero (1.00 mg/l or less D.O.) and maintained zero for 1 to 3 minutes.
6. Use the azide modification of the Winkler method to calibrate the D.O. probes. Collect a minimum of twenty (20) D.O. observations for each D.O. probe between 10 and 98% of saturation.

II. Detailed test procedures:

A. Initial setup
1. Inspect aeration basin for adequate cleanliness and correct water depth.
2. Check installation of the airflow-monitoring device.
3. Check D.O. probe thermisters for liquid temperature monitoring.
4. Prepare 2 YSI (Yellow Springs Instruments) Dissolved Oxygen (D.O.) probes for installation.
   a) Replace electrolyte solution and membranes on each D.O. probe
   b) Connect probes to YSI D.O. meters
   c) Check each probe for functioning stirrer mechanism

d) Connect all D.O. meters to computer for data logging

5. Check the placement of each D.O. probe in the test basin.
6. Start the aerator and begin aerating the test tank.
7. Check installation of the pressure gauge in the pump discharge piping system for the accurate determination of the pump discharge pressure.
8. Dissolve Cobalt Chloride into a container of water.
9. Pour Cobalt solution into the aeration basin.
10. Allow a minimum of thirty minutes mixing of the cobalt into the aeration basin before the start of testing.

B. Procedures for clean water aeration testing.

1. Adjust the airflow rate to the test basin to the required test airflow.
2. Read and record the following data:
   a) Site barometric pressure (PSIA)
   b) Operating discharge pressure (PSIG)
   c) Observed air flow rate on the Dwyer air flow meters
   d) Liquid Temperature (°C)
   e) Aeration basin oxygen saturation value C_{so} (mg/l)
   f) Ambient temperature
   g) Relative Humidity, %
3. Pour the sodium sulfite into the aeration test basin.
4. Begin observing D.O. meters.
5. Monitor D.O. on each of the YSI meters as it drops to 1.0 mg/l.
6. Continue recording D.O. values versus time for each of the D.O. probes, obtaining a minimum of 80 D.O. values for each probe.
7. Stop all recording of D.O. values when the aeration basin has reached $6/K_La$.
8. Perform non-linear regression analysis on the collected data per ASCE Standard.
   a) Determine K_La_{20} values for each probe
   b) Calculate SOTR, SOTE, and SAE.
9. Repeat steps 1-8 for each test run.

4. DATA ANALYSIS METHOD

The air flow velocity observed using the Dwyer flow meters must be corrected to standard conditions using the following equations[1]:

To obtain the actual air flow rate:

$$ACFM = \frac{V \times A}{144} \qquad \textbf{Eq. 4-1}$$

Where:

V = Observed Velocity from flow meter, Ft/sec
A = Inside cross sectional area of air delivery pipe (2"∅ Sch 80 PVC – 2.953 in²)
144 = Unit conversion factor, In²/Ft²

The air flow rate in ACFM is then to standard conditions using Eq. A-1 from the ASCE Standard:

[1] Spink, L.K.
"Principles and Practice of FLOW METER ENGINEERING" Ninth Edition, 1975
The FOXBORO COMPANY, Foxboro, Mass.

$$Q_S = 36.2 \times \left[\frac{(BP + LP) \times \left(1 - \frac{Rh \times Pva}{BP}\right)}{460 + LT} \right] \times ACFM$$ **Eq. 4-2**

where:

BP = Site Barometric Pressure, PSIA
LP = Flowing Line Pressure, PSIG
LT = Flowing Line Temperature, ºF
Rh = Relative Humidity, %
Pva = Vapor Pressure of Water at ambient temperature
Q_S = Humidity corrected air flow rate, SCFM
SCFM = Standard Cubic Feet per Minute (14.696 PSIA, 68ºF, 36% RH and a density of 0.075 Lb/Ft³)

The basic mass-transfer model[2] used to determine oxygen transfer is as follows:

$$\frac{dC}{dT} = K_L a \left(C_\infty^* - C\right)$$ **Eq. 4-3**

Which, upon integration, with initial condition C = C_o at t =0, becomes:

(logarithmic form)

$$\ln\left[\frac{C_\infty^* - C}{C_\infty^* - C_o}\right] = -K_L a\ t$$ **Eq. 4-4**

or

(exponential form)

$$C = C_\infty^* - \left(C_\infty^* - C_O\right) e^{-k_L a\ t}$$ **Eq. 4-5**

Where:

C = D.O. Concentration, mg/L
C^*_∞ = Equilibrium D.O. concentration, the concentration obtained as time approaches infinity, mg/L
C_0 = D.O. concentration at time zero, mg/L
$K_L a$ = Apparent volumetric mass transfer coefficient, t^{-1}

The overall mass transfer coefficient ($K_L a_T$) is obtained experimentally by aerating deoxygenated water and observing the rate of change of dissolved oxygen (D.O.) concentration about time.

A non-linear regression of D.O. about time is used to determine $K_L a_T$, C^*_∞, and C_0.

The logarithmic form of the mass transfer model can be rearranged to determine $K_L a_T$ using a log-deficit linear regression as follows:

2 Brown, L.C. and Baillod, C.R., "Modeling and Interpreting Oxygen Transfer Data", A.S.C.E. Jour. Environ. Engr. Div., 108, EE4, 607 (1982)

$$K_L a_T = \frac{60}{t_2 - t_1} \ln\left[\frac{C^*_\infty - C_1}{C^*_\infty - C_2}\right]$$ **Eq. 4-6**

Where:

K_La_T = Apparent volumetric mass transfer coefficient at test liquid temperature T, hr^{-1}

C^*_∞ = The observed saturation concentration of oxygen in the test basin at test temperature and barometric pressure at equilibrium, mg/L after an aeration period equal to $6/K_La_T$

C_1 and C_2= Dissolved oxygen concentration at time t_1 and t_2 respectively, mg/L

For purposes of comparison, K_La_T must be corrected to standard temperature, 20°C. The appropriate correction has been found empirically to be:

$$\mathbf{K_L a_{20}} = K_L a_T \Theta^{(20-T)}$$ **Eq. 4-7**

Where:

T = test liquid temperature (°C)

Θ = 1.024 for all T

With the value of K_La_{20} known, it is possible to calculate the pounds of oxygen transferred to the test liquid at standard conditions of 20°C, maximum oxygen deficit (dissolved oxygen equal to zero), one atmosphere barometric pressure, and alpha and beta equal to 1.0 (clean tap water) for each sample point.

$$\text{SOTR}_i = K_L a_{20i} C^*_{\infty 20i} V$$ **Eq. 4-8**

Where:

$SOTR_i$ = pounds of oxygen transferred to the test liquid, lb O_2 /hr, for Probe i

$C^*_{\infty 20i}$ = $C^*_\infty\left(\frac{1}{\tau\Omega}\right)$

- τ = Temperature correction factor, C^*_{st}/C^*_{s20}
  - **C^*_{s20}** = 9.092 mg/L, standard D.O. concentration at 20°C and one atmosphere
  - **C^*_{st}** = oxygen saturation concentration from **Standard Methods**, mg/L, at test liquid temperature *T*
- Ω = Pressure correction factor, P_b/P_s
  - **P_b** = Site barometric pressure, PSIA
  - **P_s** = Standard barometric pressure, 14.73 PSIA

V **=** Liquid volume of water in the test tank with aerators turned off

The overall average value of SOTR is then calculated as the average of the individual $SOTR_i$ values determined for each sample point.

Calculate the standard percent oxygen transfer (SOTE - %) once the oxygen transfer rate is known using the following equation:

$$\textbf{SOTE} = \frac{SOTR\,x100}{SCFM\,x1.036}$$ **Eq. 4-9**

The pump water horsepower can be determined adiabatically as follows:

$$\mathbf{HP}_{water} = \frac{Q_L\left(\frac{P_1}{0.4335}\right)}{3960}$$ **Eq. 4-10**

Where:
Q_L = Liquid flow rate, GPM
P_1 = Injector Inlet Pressure, PSIG

Then:

$$\mathrm{HP}_{\mathrm{wire}} = \frac{HP_{water}}{(Eff)}$$ **Eq. 4-11**

Where:
HP_{wire} = Electrical power demand
Eff = Pump and motor efficiency, (60% overall)

Calculate the standard aerator efficiency (SAE) using the following equation:

$$\mathrm{SAE} = N_O = \frac{SOTR}{HP}$$ **Eq. 4-12**

Where:
No = aerator efficiency, lb. O_2/hr-HP
SOTR = standard oxygen transfer rate, lb. O_2/hr
HP = Total operating HP_{wire}

Finally, the reported values are normalized to a standard TDS concentration of 1,000 mg/L using the following:

$$K_L a_{T\ \ TDS\ Corrected} = K_L a_{T\ \ observed} \times e^{(0.0000965\times[1000-TDS])}$$ **Eq. 4-13**

Where:

TDS = Observed Total Dissolved Solids concentration for each run, mg/L

All values are then recalculated based on the corrected $K_L a_T$.

5. RESULTS

The following table is a summary of the test results obtained for the AIA air injection nozzles Detailed printouts of each test run are included in the appendix.

Figures 5-1 through 5-7 are plots of the results obtained during the oxygen transfer testing.

Table 5-1 Summary of Results

DATE:	3-Jun-04	3-Jun-04	3-Jun-04	3-Jun-04
RUN:	1	2	3	4
Barometric Pres. (PSIA)	14.47	14.47	14.47	14.47
Ambient Temperature (°F)	76.10	75.70	76.10	76.20
Relative Humidity (%)	0.69	0.70	0.73	0.70
Water Temp. (°C)	24.40	25.40	26.93	27.73
Side Water Depth (ft)	5.00	5.00	5.00	5.00
Air Release Depth (ft)	4.00	4.00	4.00	4.00
Tank Length (ft)	6.57	6.57	6.57	6.57
Tank Width (ft)	2.00	2.00	2.00	0.61
Pumping Rate, GPM	125.00	113.00	60.20	52.80
Pump Power, HP_{wire} (60% Eff)	7.50	5.55	4.27	2.88
Gas to Liquid Ratio (V_G/V_L)	1.58	1.40	1.99	1.69
Injector Inlet Pressure (PSIA)	55.00	45.00	65.00	50.00
Average Air Flow (SCFM)	26.46	21.10	16.01	11.93
C* (mg/l)	8.71	8.32	8.09	8.01
$C_{sm}T$ (Standard Methods, mg/l)	8.36	8.20	7.98	7.86
C^*_{20} Standard Conditions	9.62	9.36	9.36	9.41
Tank Volume (Ft^3)	65.70	65.70	65.70	65.70
(Gallons)	491.47	491.47	491.47	491.47
TDS (mg/L)	420.00	580.00	765.00	943.00
Motor Efficiency	0.89	0.89	0.89	0.89
Pump Power, HP_{water}	4.00	2.96	2.28	1.54
KLa-NLR 1	78.99	68.32	54.88	40.32
KLa-NLR 2	82.36	67.21	55.11	40.27
AVG KLA-NLR	**80.67**	**67.76**	**55.00**	**40.29**
KLa20 NLR	**72.68**	**59.62**	**46.66**	**33.54**
KLa-LRA 1	83.01	68.96	55.13	42.35
KLa-LRA 2	73.23	66.50	54.13	40.58
AVG KLA-LRA	**78.12**	**67.73**	**54.63**	**41.47**
KLa20 LRA	**70.38**	**59.59**	**46.35**	**34.52**
KLa20 NLR-LRA AVG	**71.53**	**59.60**	**46.51**	**34.03**
SOTR Observed	**2.83**	**2.29**	**1.79**	**1.31**
SOTR/Diffuser	**2.83**	**2.29**	**1.79**	**1.31**
SOTE Observed	**10.3%**	**10.5%**	**10.8%**	**10.6%**
SAE Observed	**0.38**	**0.41**	**0.42**	**0.46**
KLa20 (TDS Corrected)	**75.65**	**62.07**	**47.58**	**34.22**
SOTR (TDS Corrected)	**2.99**	**2.38**	**1.83**	**1.32**
SOTR/Diffuser	**2.99**	**2.38**	**1.83**	**1.32**
SOTE (TDS Corrected)	**10.9%**	**10.9%**	**11.0%**	**10.7%**
SOTE/Ft (TDS Corrected)	**2.7%**	**2.7%**	**2.8%**	**2.7%**
SAE (TDS Corrected)	**0.40**	**0.43**	**0.43**	**0.46**

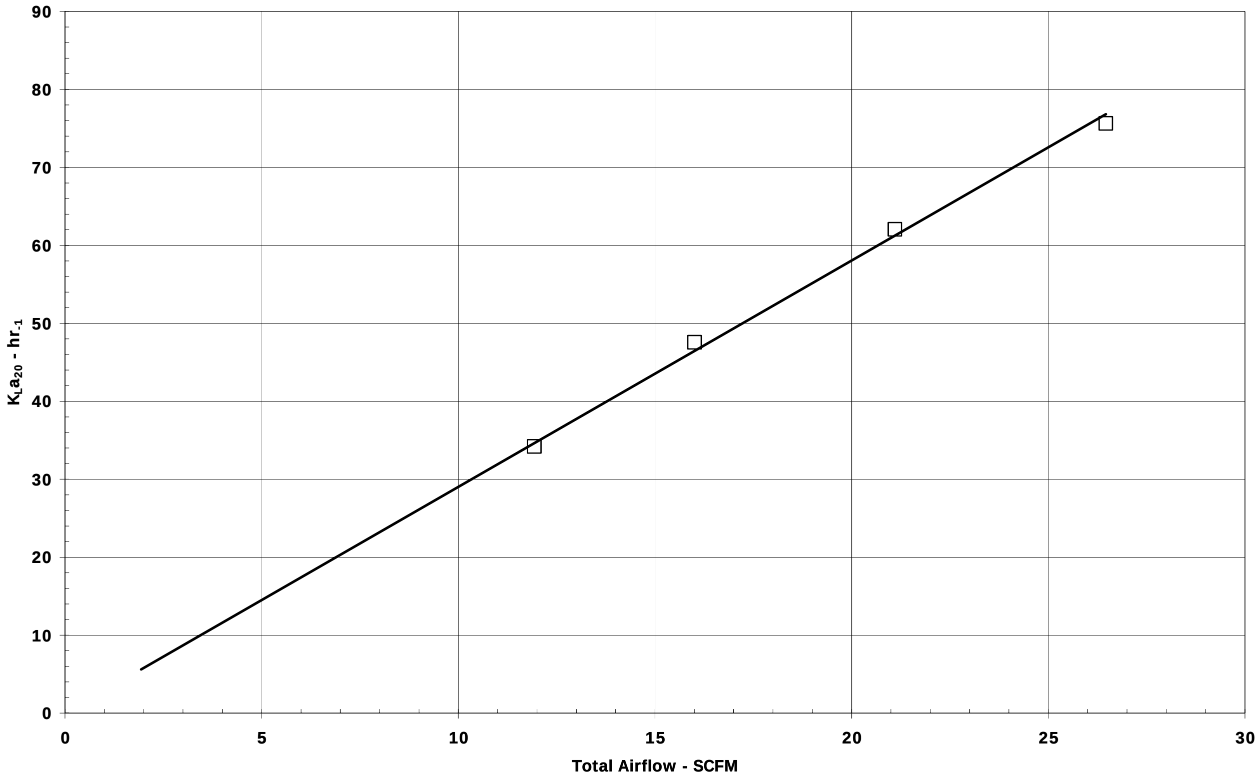


Figure 5-1 Airflow v. KLa20

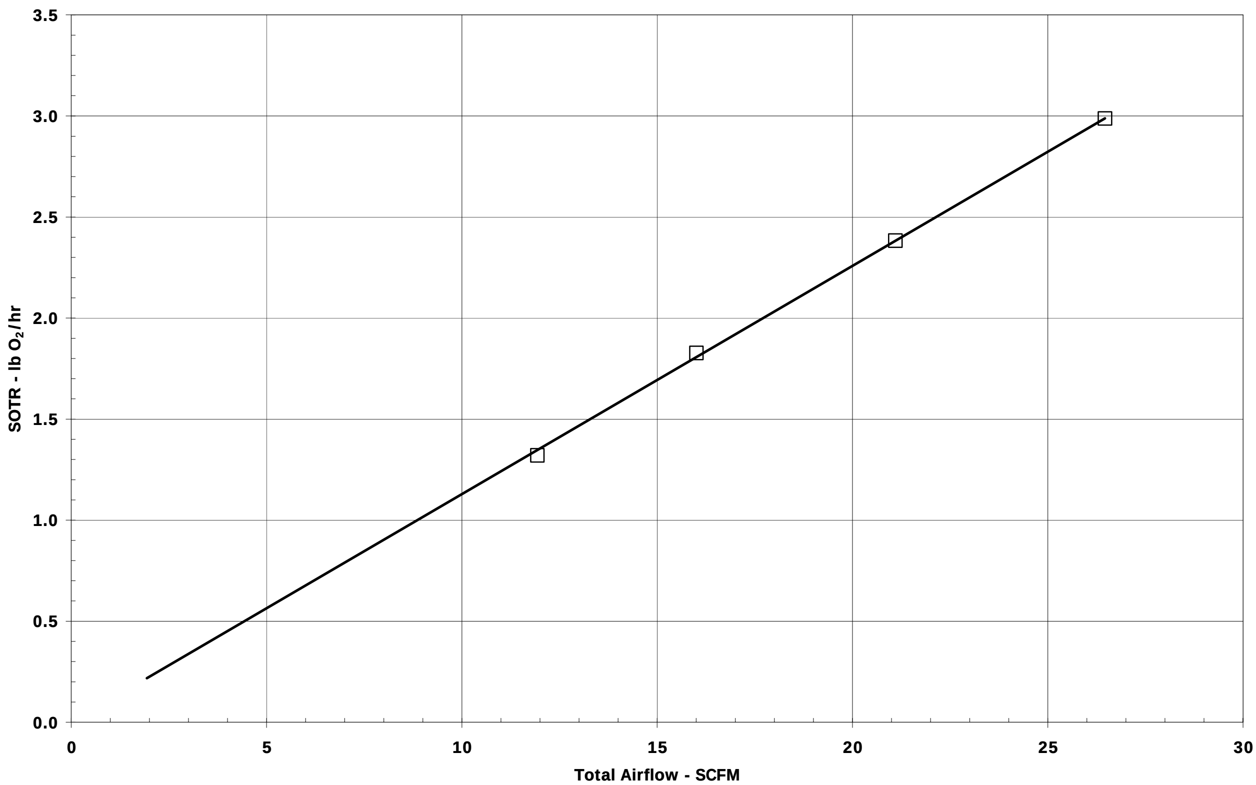


Figure 5-2 Airflow v. SOTR

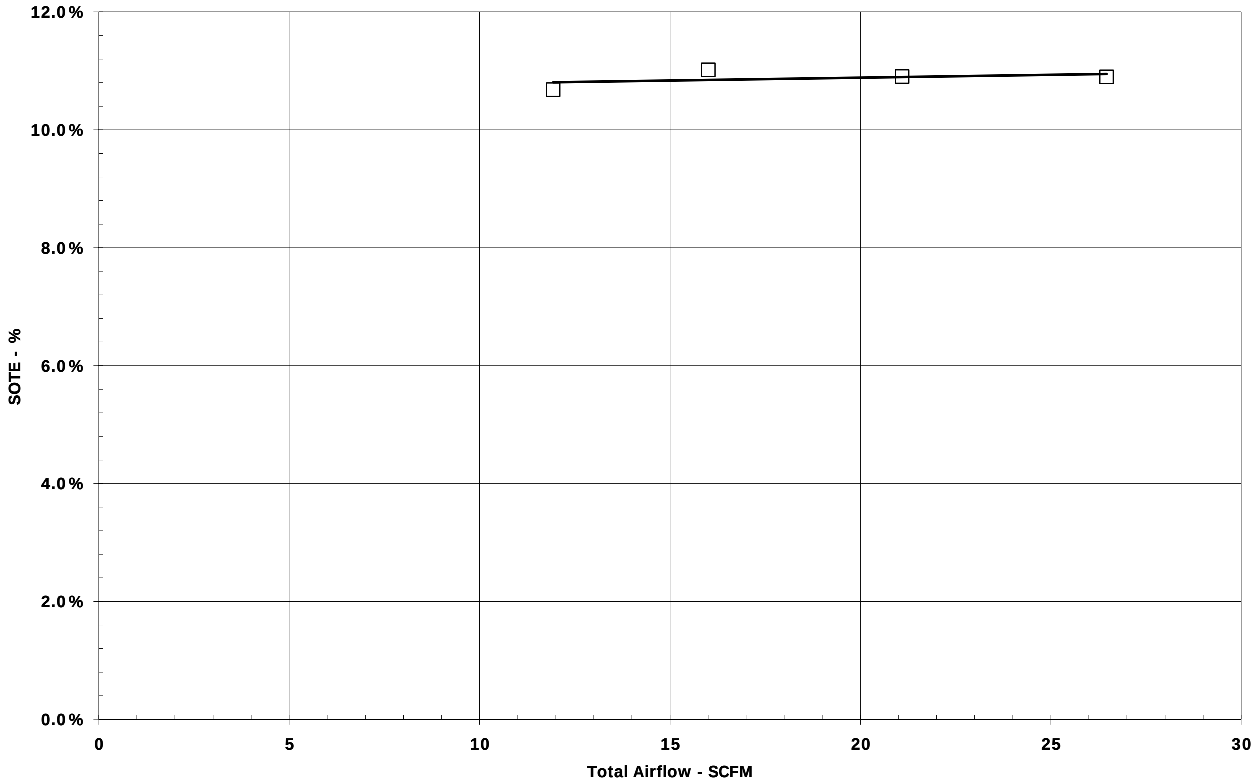


Figure 5-3 Airflow v. SOTE

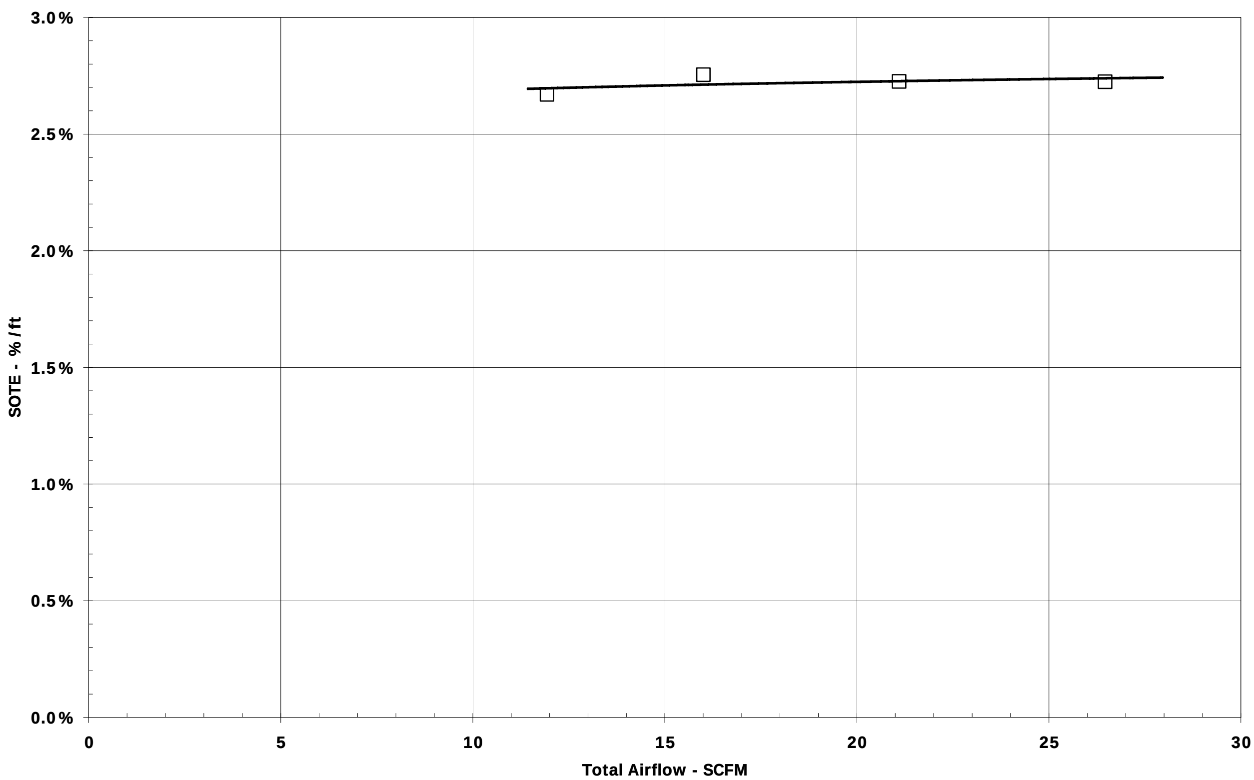


Figure 5-4 Airflow v. SOTE/Ft

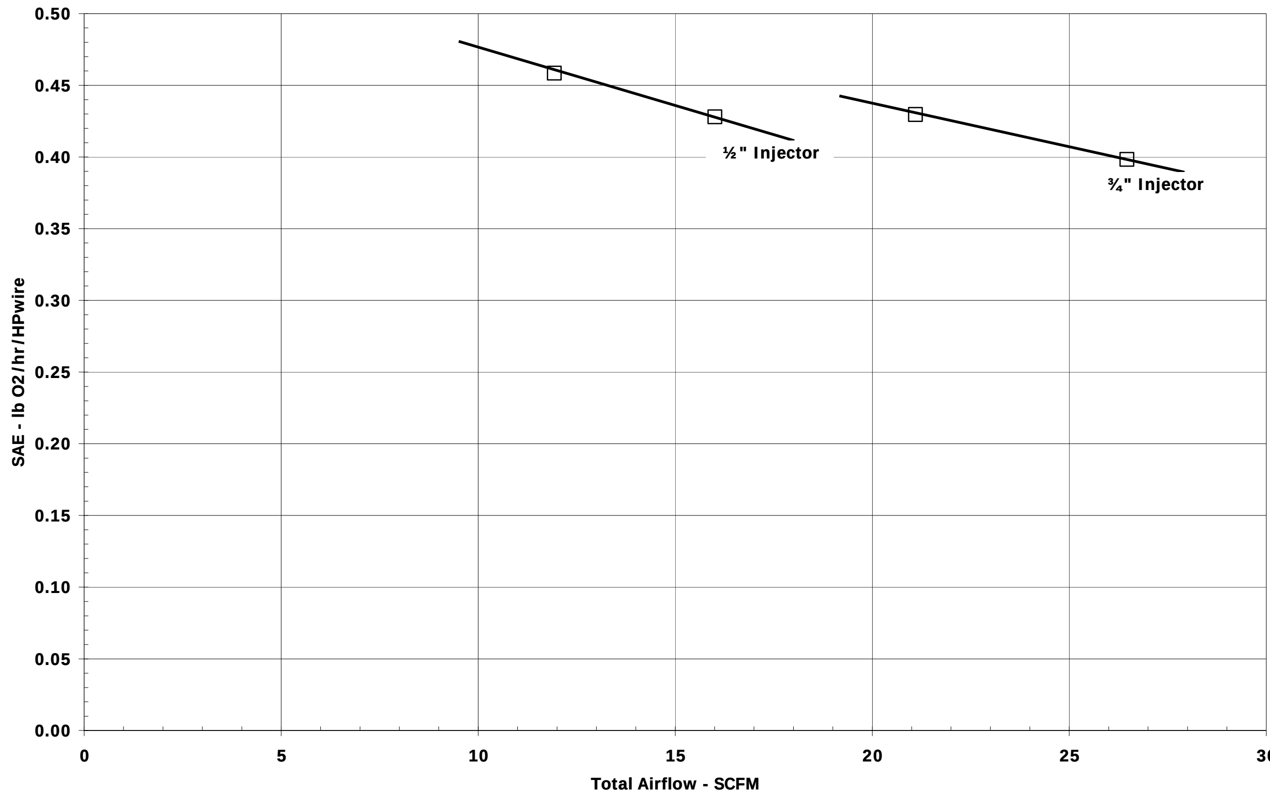


Figure 5-5 Airflow v. SAE

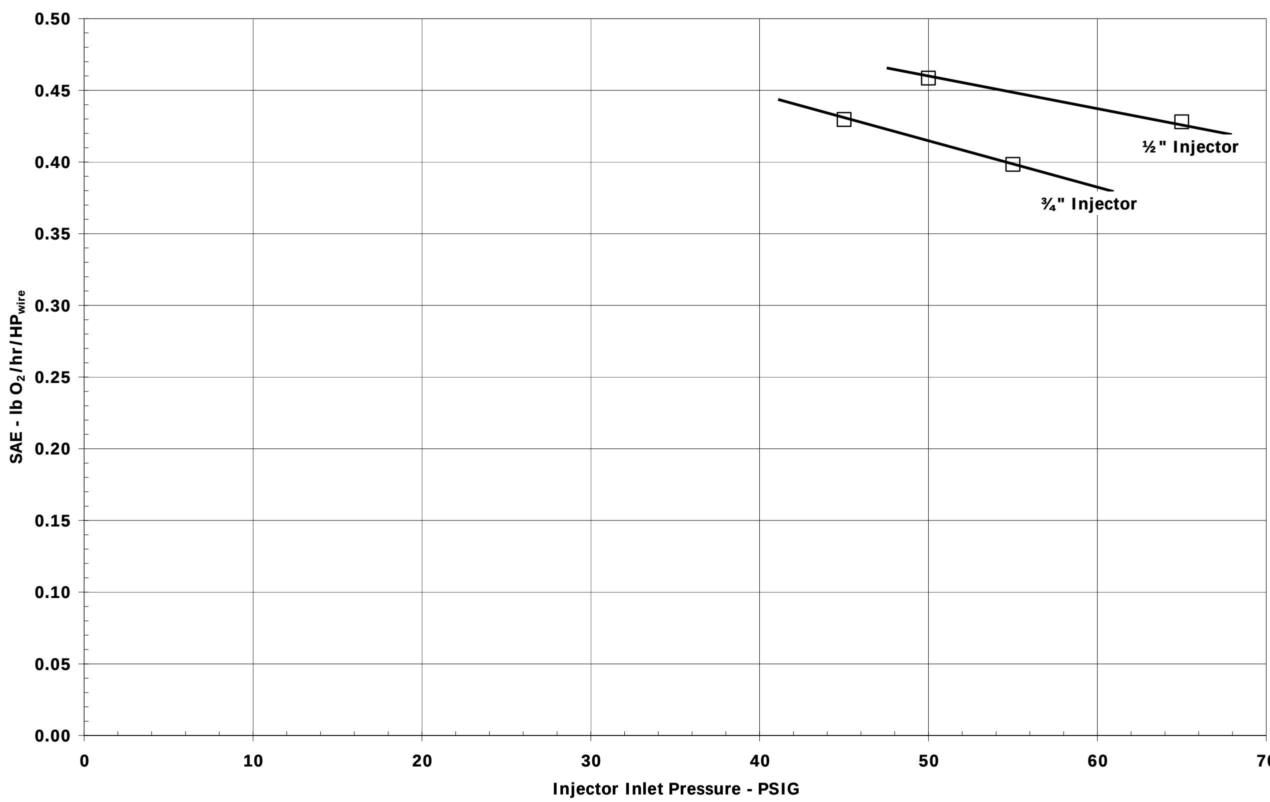


Figure 5-6 Injector Inlet Pressure v. SAE

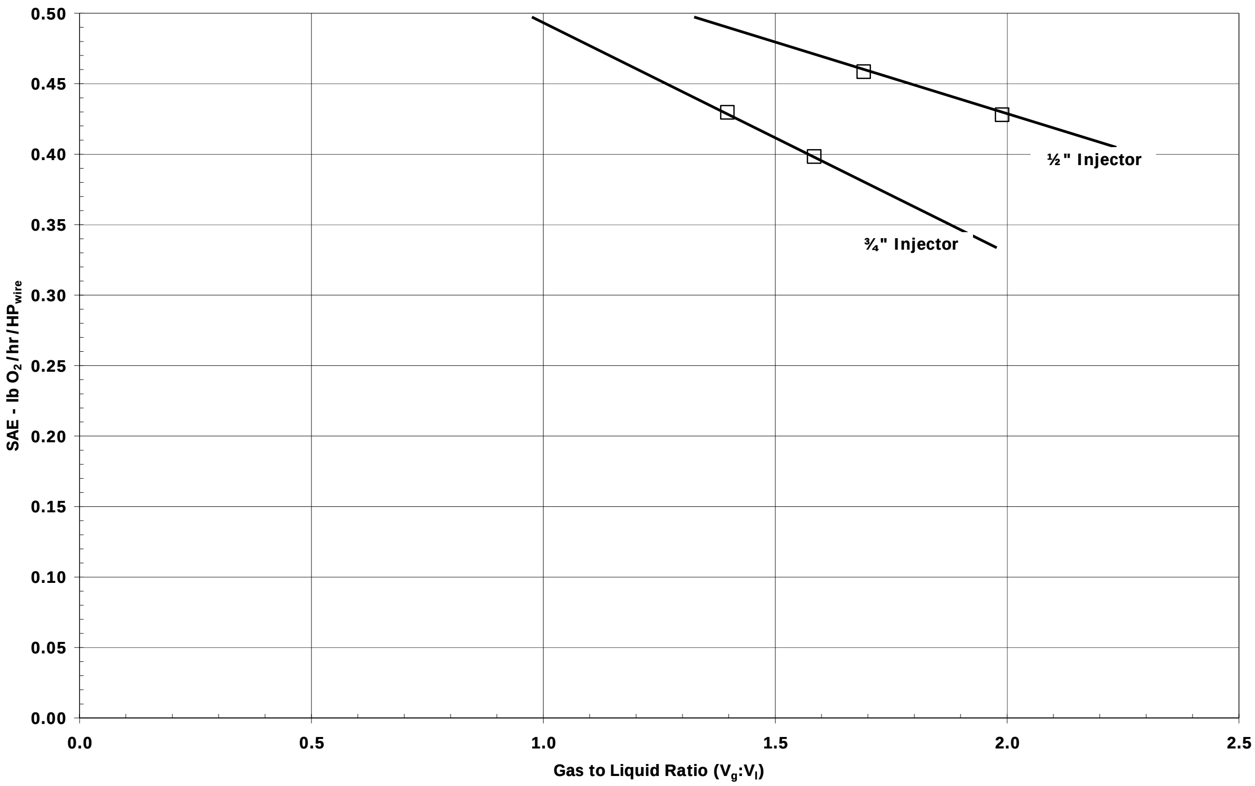


Figure 5-7 Air to Liquid Ratio v. SAE

Note that these figures indicate a very linear increase in KLa and SOTR with increasing air flow rate. The observed SAE increased with decreasing air flow rate, decreasing injector inlet pressure and decreasing gas to liquid ratios. The trend of improved SAE at lower operating pressures is similar to that observed in other aspirating jet type aerators.

6. CERTIFICATION

GSEE, Inc., certifies that the results presented in this report are accurate and were obtained using the test procedures described above.

Gerald L. Shell, PE

7. APPENDIX

GSEE, Inc.
Environmental Services

ASCE OXYGEN TRANSFER DETERMINATION

PROJECT: Advanced Industrial Aeration - ¾"
DATE: 3-Jun-04
RUN: 1

599 Waldron Rd.
LaVergne, TN 37086
615/793-7547
FAX 615/793/5070

	Initial	Mid Point	Final			
Barometric Pres. (PSIA)	14.460	14.469	14.470	Average Air Flow (SCFM)		26.463
(mm Hg)	741.90	741.90	741.90	Effective Depth Correction (f)		0.50
Ambient Temperature (°F)	75.90	76.10	76.30	Headloss (In. H_2O)		-48.00
Relative Humidity (%)	68%	69%	69%	C* (mg/l)		8.71
Line Pressure (PSIG)	0.000	0.000	0.000	$C_{sm}T$ (Standard Methods, mg/l)		8.36
(In. Hg)	0.00	0.00	0.00	C^*_{20} Standard Conditions		9.62
Line Temperature (°F)	75.90	76.10	76.30	Tank Volume (Ft³)		65.7
Observed Air Flow (CFH)	1,636	1,636	1,636	(Gallons)		491.5
Water Temp. (°C)	24.40	24.40	24.40	(m³)		1.9
Number Of Aeration Devices		1		(Million Pounds)		0.004
Side Water Depth (ft)		5.00	(1.52 m)	#Na_2SO_3 @ 250%	Stoichiometric	0.71
Air Release Depth (ft)		4.00	(1.22 m)	Cobalt Concen. (mg/l)		0.100
Tank Length (ft)		6.57	(2.00 m)	Grams Cobalt Chloride		0.8
Tank Width (ft)		2.00	(0.61 m)	TDS (mg/L)		420.00
Tank Diameter (ft)		0.00	(0.00 m)			
Gear Reducer or Belt Efficiency		100.0%		Motor Efficiency		89.0%
Pumping Rate, GPM		125.0		Pump Power, HP_{water}		4.00
Mixer Power, HP_{wire}		0.00	(0.00 kw)	Mixer RPM		0.0
Pump Power, HP_{wire} (60% Eff)		7.50	(5.59 kw)	Mixer Power, HP_{water}		0.00
Blower HP_{wire}		0.00	(0.00 kw)	Blower HP_{motor}		0.00
Total HP_{wire} av.		7.50	(5.59 kw)	Total HP_{water} av.		4.00
Gas to Liquid Ratio (V_G/V_L)		1.58				
Injector Inlet Pressure (PSIA)		55.00		Injector Discharge Pressure (PSIA)		55.00

NON-LINEAR REGRESSION RESULTS

Probe	K_La_T	K_La_{20}	SOTR	SOTR/Dev	SOTE	SAE_{wire}	C*	Std. Err.
1	78.99	71.17	2.81	2.81	10.25	0.37	8.71	0.0501
2	82.36	74.19	2.93	2.93	10.69	0.39	8.72	0.2600
avg.	80.67	72.68	2.87	2.87	10.47	0.38	8.71	0.1551
TDS	***85.32***	***76.86***	***3.04***	***3.04***	***11.07***	***0.40***	***8.71***	***2.77%***
Corrected	/hr	/hr	#O2/hr		%	#O2/hr-WHP		

OXYGEN TRANSFER

Total SCFM:	**26.5**	**42.546**	**:Nm³/Hr**	**#O2/Hr:**	**2.87**	**1.302**	**:KgO2/Hr**
SCFM/Diff.:	**26.46**	**42.546**	**:Nm³/hr/Diff**	**#O2/Hr/Diff.:**	**2.87**	**1.302**	**:KgO2/Hr/Diff.**
SCFM/KCF:	**402.8**	**22.869**	**:Nm³/hr/m³**	**#O2/Day:**	**68.9**	**31.3**	**:KgO2/Day**
Total ICFM:	**23.2**	**2.62%**	**:%/Ft.**	**#O2/Day/1000 Ft³:**	**1,049**	**16.80**	**:KgO2/Day/m³**

LINEAR REGRESSION RESULTS

Probe	K_La_T	K_La_{20}	SOTR	SOTR/Dev	SOTE	SAE_{wire}	C*	Corr.Coeff.
1	83.01	74.78	2.93	2.93	10.69	0.39	8.64	0.9992
2	73.23	65.97	2.59	2.59	9.43	0.34	8.65	0.9760
avg.	78.12	70.38	2.76	2.76	10.06	0.37	8.64	0.9876
TDS	***82.61***	***74.43***	***2.92***	***2.92***	***10.64***	***0.39***	***8.64***	***2.66%***
Corrected	/hr	/hr	#O2/hr		%	#O2/hr-HPw		

EUROPEAN STANDARD

Probe	K_La_T	K_La_{10}	SOTR	SOTR/Dev	SAE	C*
1	81.00	58.38	1.30	1.30	0.23	8.71
2	77.79	56.07	1.25	1.25	0.22	8.72
avg.	79.40	57.23	1.28	1.28	0.23	8.71
	/hr	/hr	kg O_2/hr		kg O_2/hr-kw	mg/L

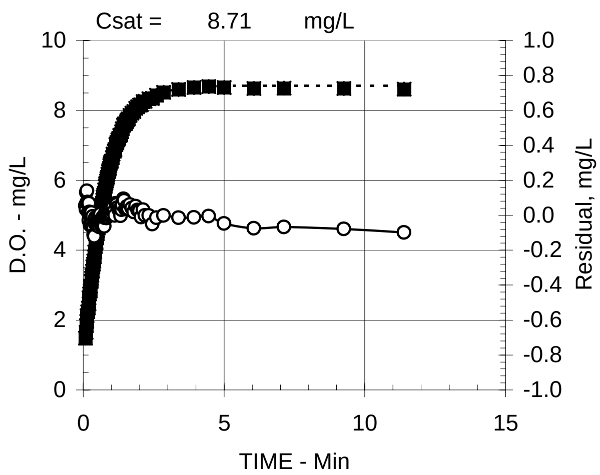
Pt. 1	est.	calc.		Pt. 2	est.	calc.		Pt. 3	lot Used	Pt. 4	lot Used
C0	0.62	0.62		C0	0.30	0.30					
Kla-in	78.99	78.99		Kla-in	82.36	82.36					
C*	8.71	8.71		C*	8.72	8.72					
Sq.Diff.	0.2313			Sq.Diff.	6.2212						

Time	D.O.	D.O.calc	diff	Time	D.O.	D.O.calc	diff
0.08	1.48	1.4	0.1	0.08	1.40	1.2	0.2
0.10	1.65	1.6	0.0	0.10	1.69	1.4	0.3
0.11	1.84	1.7	0.1	0.11	1.80	1.5	0.3
0.13	1.96	1.9	0.1	0.13	1.90	1.7	0.2
0.14	2.12	2.0	0.1	0.14	1.93	1.8	0.2
0.16	2.23	2.2	0.1	0.16	2.01	2.0	0.0
0.18	2.34	2.3	0.0	0.18	2.05	2.1	-0.1
0.20	2.46	2.5	0.0	0.20	2.22	2.3	-0.1
0.21	2.64	2.6	0.1	0.21	2.35	2.4	-0.1
0.23	2.75	2.7	0.0	0.23	2.61	2.6	0.0
0.25	2.83	2.9	-0.1	0.25	2.63	2.7	-0.1
0.26	2.97	3.0	0.0	0.26	2.76	2.8	-0.1
0.28	3.10	3.1	0.0	0.28	2.51	3.0	-0.5
0.29	3.20	3.2	0.0	0.29	2.67	3.1	-0.4
0.31	3.28	3.3	0.0	0.31	2.89	3.2	-0.3
0.33	3.40	3.5	-0.1	0.33	3.29	3.4	-0.1
0.34	3.53	3.5	0.0	0.34	3.57	3.4	0.1
0.36	3.60	3.7	-0.1	0.36	3.69	3.6	0.1
0.38	3.69	3.8	-0.1	0.38	3.86	3.7	0.1
0.40	3.81	3.9	-0.1	0.40	3.55	3.9	-0.3
0.41	3.95	4.0	0.0	0.41	3.55	3.9	-0.4
0.43	4.10	4.1	0.0	0.43	4.21	4.1	0.2
0.45	4.19	4.2	0.0	0.45	3.95	4.2	-0.2
0.46	4.24	4.3	-0.1	0.46	4.12	4.2	-0.1
0.48	4.35	4.4	-0.1	0.48	4.37	4.4	0.0
0.50	4.47	4.5	0.0	0.50	4.38	4.5	-0.1
0.51	4.56	4.6	0.0	0.51	4.66	4.5	0.1
0.53	4.63	4.7	-0.1	0.53	4.72	4.7	0.1
0.55	4.74	4.8	0.0	0.55	4.62	4.8	-0.1
0.56	4.81	4.8	0.0	0.56	4.76	4.8	-0.1
0.58	4.87	4.9	-0.1	0.58	4.84	4.9	-0.1
0.59	4.97	5.0	0.0	0.59	5.01	5.0	0.0
0.61	5.09	5.1	0.0	0.61	4.81	5.1	-0.3
0.63	5.15	5.2	0.0	0.63	5.12	5.2	-0.1
0.65	5.21	5.3	-0.1	0.65	5.18	5.3	-0.1
0.66	5.29	5.3	0.0	0.66	5.44	5.3	0.1
0.68	5.35	5.4	-0.1	0.68	5.47	5.4	0.1
0.69	5.43	5.4	0.0	0.69	5.87	5.5	0.4
0.71	5.52	5.5	0.0	0.71	5.72	5.5	0.2
0.73	5.58	5.6	0.0	0.73	5.70	5.6	0.1
0.75	5.63	5.7	-0.1	0.75	5.76	5.7	0.0
0.76	5.72	5.7	0.0	0.76	6.05	5.8	0.3
0.78	5.82	5.8	0.0	0.78	5.80	5.8	0.0
0.80	5.89	5.9	0.0	0.80	6.12	5.9	0.2
0.81	5.92	5.9	0.0	0.81	6.10	5.9	0.2
0.83	5.98	6.0	0.0	0.83	6.21	6.0	0.2
0.84	6.04	6.0	0.0	0.84	5.90	6.1	-0.2
0.86	6.09	6.1	0.0	0.86	6.15	6.1	0.0
0.88	6.17	6.2	0.0	0.88	6.33	6.2	0.1
0.90	6.25	6.2	0.0	0.90	6.38	6.3	0.1
0.91	6.28	6.3	0.0	0.91	6.19	6.3	-0.1
0.93	6.34	6.3	0.0	0.93	6.83	6.4	0.5
0.94	6.42	6.4	0.1	0.94	6.26	6.4	-0.1
0.96	6.47	6.4	0.0	0.96	6.72	6.5	0.3
0.98	6.52	6.5	0.0	0.98	6.59	6.5	0.1
1.00	6.55	6.5	0.0	1.00	6.38	6.6	-0.2
1.03	6.65	6.6	0.0	1.03	6.34	6.7	-0.3
1.06	6.75	6.7	0.0	1.06	6.81	6.8	0.1
1.10	6.83	6.8	0.0	1.10	6.52	6.9	-0.3
1.13	6.88	6.9	0.0	1.13	6.50	6.9	-0.4
1.16	7.02	7.0	0.1	1.16	6.81	7.0	-0.2
1.19	7.08	7.0	0.1	1.19	6.46	7.1	-0.6
1.23	7.15	7.1	0.0	1.23	7.01	7.2	-0.1
1.26	7.20	7.2	0.0	1.26	6.90	7.2	-0.3
1.30	7.28	7.2	0.0	1.30	7.35	7.3	0.0
1.33	7.30	7.3	0.0	1.33	7.41	7.4	0.0
1.36	7.39	7.4	0.0	1.36	7.55	7.4	0.1
1.39	7.47	7.4	0.1	1.39	7.95	7.5	0.5
1.43	7.57	7.5	0.1	1.43	7.44	7.5	-0.1
1.46	7.61	7.5	0.1	1.46	7.39	7.6	-0.2
1.50	7.62	7.6	0.0	1.50	7.64	7.6	0.0
1.53	7.67	7.6	0.0	1.53	8.01	7.7	0.3
1.56	7.72	7.7	0.0	1.56	8.15	7.7	0.4
1.60	7.76	7.7	0.0	1.60	7.59	7.8	-0.2
1.66	7.86	7.8	0.1	1.66	8.05	7.9	0.2
1.73	7.92	7.9	0.0	1.73	8.54	7.9	0.6
1.80	7.97	8.0	0.0	1.80	8.21	8.0	0.2
1.86	8.06	8.0	0.1	1.86	8.21	8.1	0.1
1.93	8.10	8.1	0.0	1.93	8.39	8.1	0.3
2.00	8.15	8.1	0.0	2.00	8.53	8.2	0.3
2.06	8.16	8.2	0.0	2.06	8.55	8.2	0.3
2.13	8.25	8.2	0.0	2.13	8.14	8.3	-0.1
2.20	8.26	8.3	0.0	2.20	7.96	8.3	-0.3
2.33	8.33	8.3	0.0	2.33	8.24	8.4	-0.1
2.46	8.34	8.4	-0.1	2.46	8.04	8.4	-0.4
2.60	8.43	8.4	0.0	2.60	8.86	8.5	0.4
2.86	8.52	8.5	0.0	2.86	8.99	8.6	0.4
3.39	8.60	8.6	0.0	3.39	8.32	8.6	-0.3
3.93	8.65	8.7	0.0	3.93	8.41	8.7	-0.3
4.46	8.68	8.7	0.0	4.46	8.86	8.7	0.2
5.00	8.65	8.7	0.0	5.00	8.14	8.7	-0.6
6.06	8.63	8.7	-0.1	6.06	8.79	8.7	0.1
7.13	8.64	8.7	-0.1	7.13	8.16	8.7	-0.6
9.26	8.63	8.7	-0.1	9.26	8.53	8.7	-0.2
11.40	8.61	8.7	-0.1	11.40	9.11	8.7	0.4

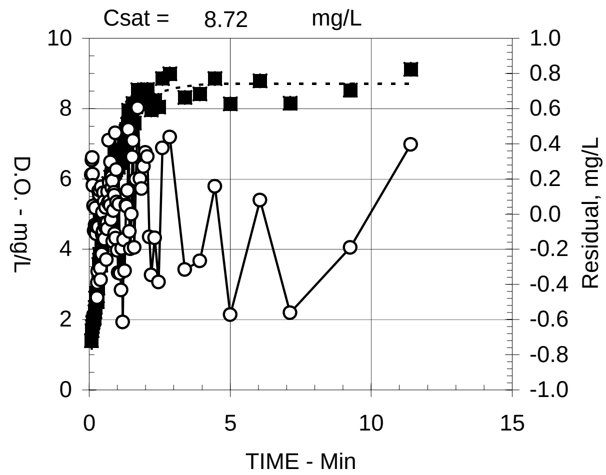
	Probe 1				Probe 2			Probe 3	Probe 4
Lower	17.00%			Lower	16.05%				
Upper	99.67%			Upper	104.53%				
	Value	Abs.Un.	%LSE		Value	Abs.Un.	%LSE		
C*	8.708	0.014	0.163	C*	8.718	0.072	0.825		
C0	0.619	0.021	3.444	C0	0.300	0.113	37.725		
KLaT	78.993	0.008	0.604	KLaT	82.356	0.041	3.006		
Error	0.050			Error	0.260				

PROJECT: Advanced Industrial Aeration - ¾"
DATE: 6/3/2004
RUN: 1.00

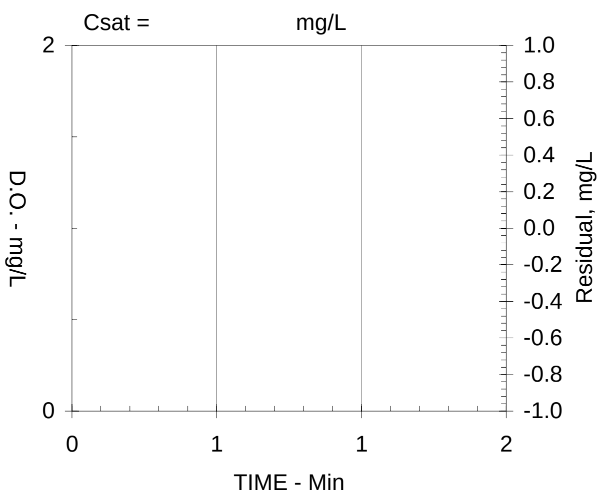
Probe #1



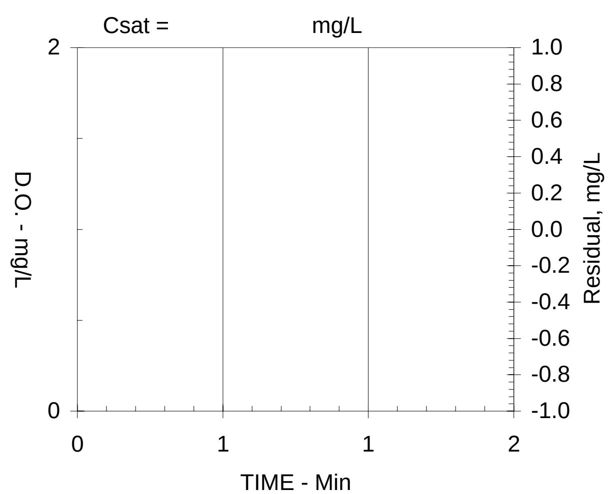
Probe #2



Probe #3

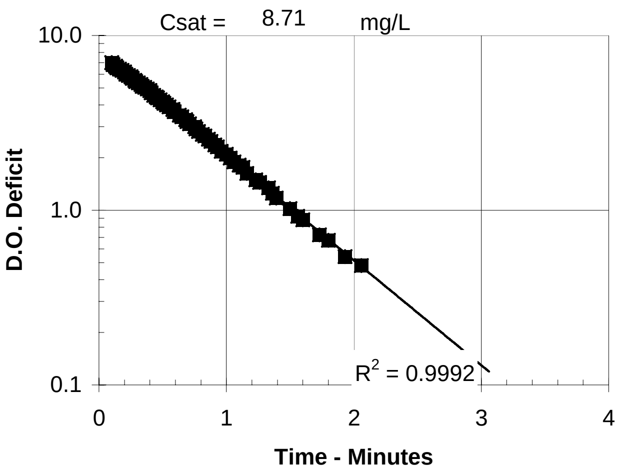


Probe #4



Project: Advanced Industrial Aeration - ¾"
Date: Jun 03, 2004
Run: 1

Probe #1



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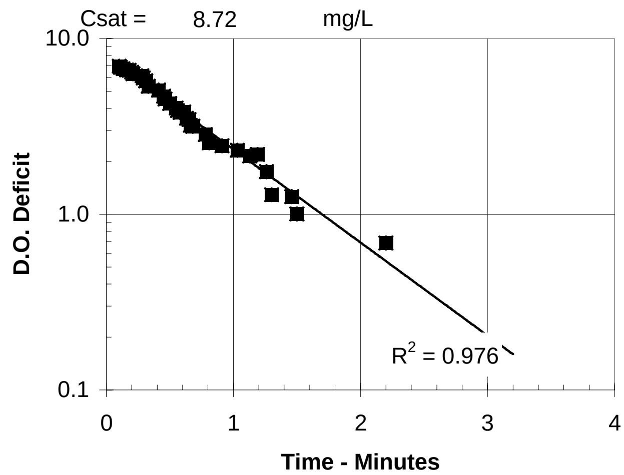
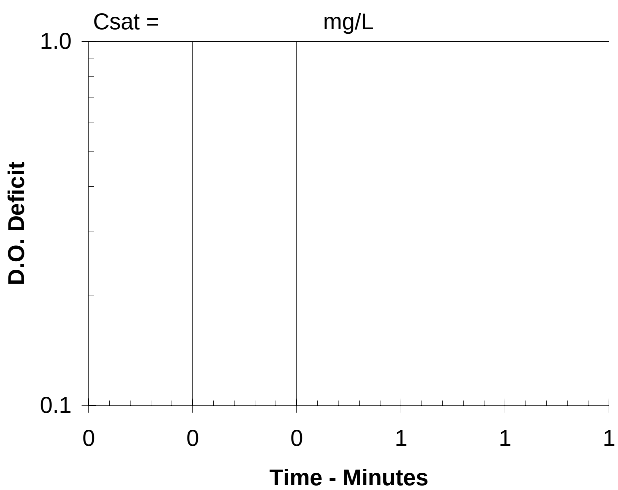
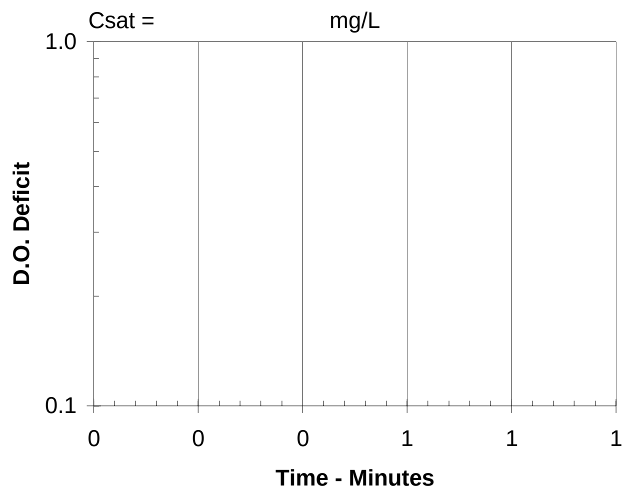


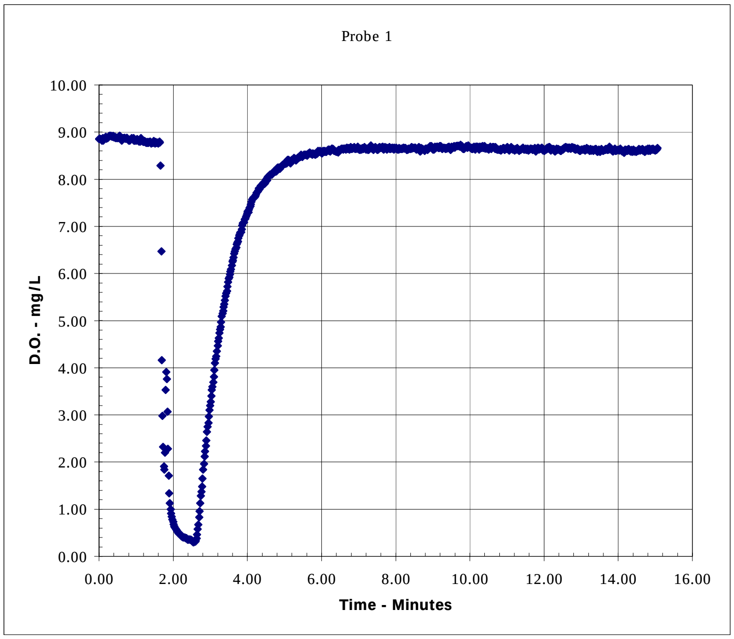
Probe #3

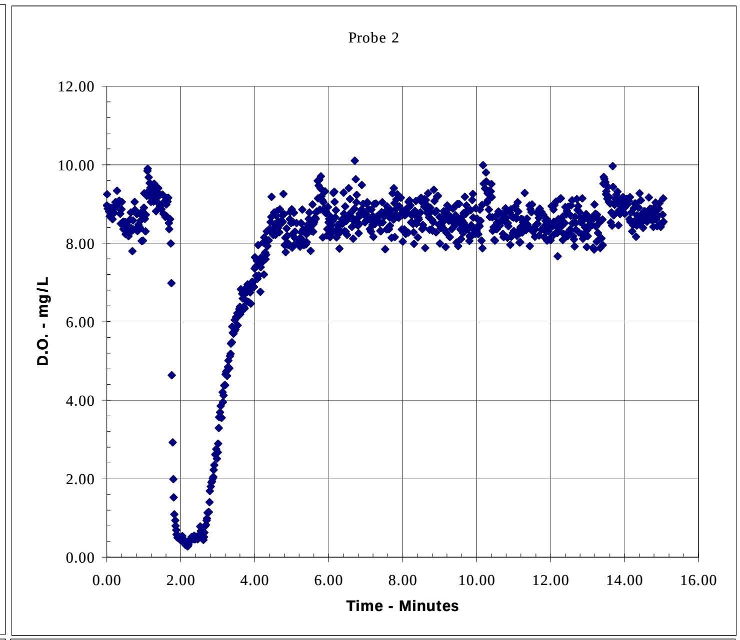


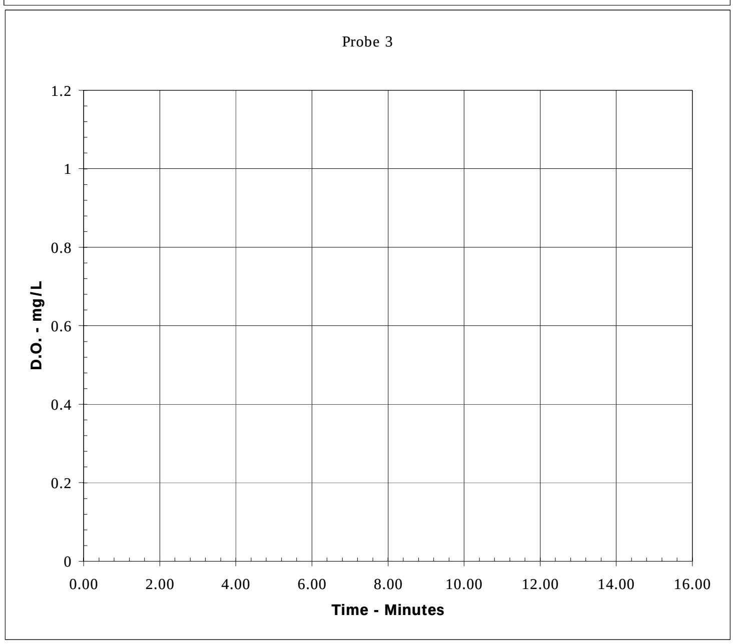
Probe #4

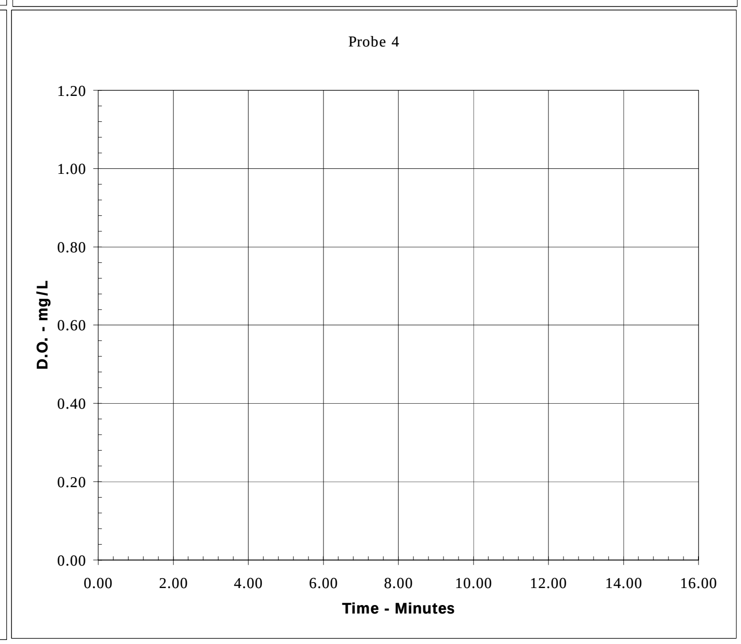


Project: Advanced Industrial Aeration - ¾"
Date: Jun 03, 2004
Run: 1


Probe 1
D.O. - mg/L
Time - Minutes


Probe 2
D.O. - mg/L
Time - Minutes


Probe 3
D.O. - mg/L
Time - Minutes


Probe 4
D.O. - mg/L
Time - Minutes

GSEE, Inc.
Environmental Services

ASCE OXYGEN TRANSFER DETERMINATION

PROJECT: Advanced Industrial Aeration - ¾"
DATE: 3-Jun-04
RUN: 2

599 Waldron Rd.
LaVergne, TN 37086
615/793-7547
FAX 615/793/5070

	Initial	Mid Point	Final			
Barometric Pres. (PSIA)	14.460	14.469	14.470	Average Air Flow (SCFM)		21.099
(mm Hg)	741.90	741.90	741.90	Effective Depth Correction (f)		0.25
Ambient Temperature (°F)	75.70	75.70	75.70	Headloss (In. H_2O)		-48.00
Relative Humidity (%)	69%	70%	70%	C* (mg/l)		8.32
Line Pressure (PSIG)	0.000	0.000	0.000	$C_{sm}T$ (Standard Methods, mg/l)		8.20
(In. Hg)	0.00	0.00	0.00	C^*_{20} Standard Conditions		9.36
Line Temperature (°F)	75.70	75.70	75.70	Tank Volume (Ft³)		65.7
Observed Air Flow (CFH)	1,304	1,304	1,304	(Gallons)		491.5
Water Temp. (°C)	25.17	25.40	25.63	(m³)		1.9
Number Of Aeration Devices		1		(Million Pounds)		0.004
Side Water Depth (ft)		5.00	(1.52 m)	#Na_2SO_3 @ 250%	Stoichiometric	0.67
Air Release Depth (ft)		4.00	(1.22 m)	Cobalt Concen. (mg/l)		0.100
Tank Length (ft)		6.57	(2.00 m)	Grams Cobalt Chloride		0.8
Tank Width (ft)		2.00	(0.61 m)	TDS (mg/L)		580.00
Tank Diameter (ft)		0.00	(0.00 m)			
Gear Reducer or Belt Efficiency		100.0%		Motor Efficiency		89.0%
Pumping Rate, GPM		113.0		Pump Power, HP_{water}		2.96
Mixer Power, HP_{wire}		0.00	(0.00 kw)	Mixer RPM		0.0
Pump Power, HP_{wire} (60% Eff)		5.55	(4.14 kw)	Mixer Power, HP_{water}		0.00
Blower HP_{wire}		0.00	(0.00 kw)	Blower HP_{motor}		0.00
Total HP_{wire} av.		5.55	(4.14 kw)	Total HP_{water} av.		2.96
Gas to Liquid Ratio (V_G/V_L)		1.40				
Injector Inlet Pressure (PSIA)		45.00		Injector Discharge Pressure (PSIA)		55.00

NON-LINEAR REGRESSION RESULTS

Probe	KLaT	KLa20	SOTR	SOTR/Dev	SOTE	SAEwire	C*	Std. Err.
1	68.32	60.11	2.31	2.31	10.56	0.42	8.32	0.0903
2	67.21	59.13	2.27	2.27	10.39	0.41	8.32	0.0915
avg.	67.76	59.62	2.29	2.29	10.47	0.41	8.32	0.0909
TDS	**70.57**	**62.08**	**2.38**	**2.38**	**10.91**	**0.43**	**8.32**	**2.73%**
Corrected	/hr	/hr	#O2/hr		%	#O2/hr-WHP		

				OXYGEN TRANSFER			
Total SCFM:	21.1	33.921	:Nm³/Hr	#O2/Hr:	2.29	1.038	:KgO2/Hr
SCFM/Diff.:	21.10	33.921	:Nm³/hr/Diff	#O2/Hr/Diff.:	2.29	1.038	:KgO2/Hr/Diff.
SCFM/KCF:	321.1	18.233	:Nm³/hr/m³	#O2/Day:	54.9	24.9	:KgO2/Day
Total ICFM:	18.5	2.62%	:%/Ft.	#O2/Day/1000 Ft³:	836	13.40	:KgO2/Day/m³

LINEAR REGRESSION RESULTS

Probe	KLaT	KLa20	SOTR	SOTR/Dev	SOTE	SAEwire	C*	Corr.Coeff.
1	68.96	60.67	2.33	2.33	10.66	0.42	8.32	0.9952
2	66.50	58.50	2.23	2.23	10.20	0.40	8.25	0.9982
avg.	67.73	59.59	2.28	2.28	10.43	0.41	8.29	0.9967
TDS	**70.53**	**62.05**	**2.37**	**2.37**	**10.86**	**0.43**	**8.29**	**2.72%**
Corrected	/hr	/hr	#O2/hr		%	#O2/hr-HPw		

EUROPEAN STANDARD

Probe	KLaT	KLa10	SOTR	SOTR/Dev	SAE	C*
1	68.64	48.36	1.05	1.05	0.25	8.32
2	66.85	47.10	1.02	1.02	0.25	8.32
avg.	67.75	47.73	1.04	1.04	0.25	8.32
	/hr	/hr	kg O2/hr		kg O2/hr-kw	mg/L

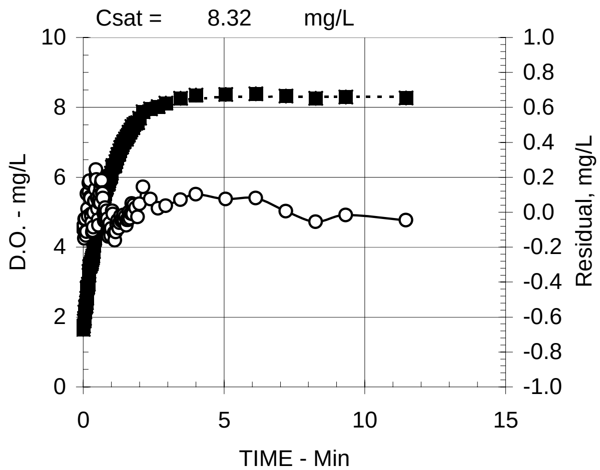
Pt. 1	est.	calc.		Pt. 2	est.	calc.		Pt. 3	lot Used	Pt. 4	lot Used
C0	1.75	1.75		C0	1.54	1.54					
Kla-in	68.32	68.32		Kla-in	67.21	67.21					
C*	8.32	8.32		C*	8.32	8.32					
Sq.Diff.	0.7915			Sq.Diff.	0.8123						

Time	D.O.	D.O.calc	diff	Time	D.O.	D.O.calc	diff
0.00	1.65	1.7	-0.1	0.00	1.64	1.5	0.1
0.01	1.74	1.8	-0.1	0.01	1.78	1.6	0.2
0.03	1.89	2.0	-0.1	0.03	1.95	1.8	0.2
0.05	1.96	2.1	-0.2	0.05	1.98	1.9	0.1
0.06	2.14	2.2	0.0	0.06	2.03	2.0	0.1
0.08	2.28	2.3	0.0	0.08	2.09	2.1	0.0
0.10	2.32	2.5	-0.1	0.10	2.15	2.3	-0.1
0.11	2.41	2.5	-0.1	0.11	2.29	2.3	0.0
0.13	2.54	2.7	-0.1	0.13	2.42	2.5	0.0
0.14	2.82	2.7	0.1	0.14	2.56	2.5	0.0
0.16	2.86	2.8	0.0	0.16	2.67	2.6	0.0
0.18	2.94	3.0	0.0	0.18	2.80	2.8	0.0
0.20	3.20	3.1	0.1	0.20	2.94	2.9	0.0
0.21	3.31	3.1	0.2	0.21	2.97	3.0	0.0
0.23	3.44	3.3	0.2	0.23	3.08	3.1	0.0
0.25	3.46	3.4	0.1	0.25	3.13	3.2	-0.1
0.26	3.51	3.4	0.1	0.26	3.24	3.2	0.0
0.28	3.53	3.5	0.0	0.28	3.33	3.4	0.0
0.29	3.57	3.6	0.0	0.29	3.37	3.4	0.0
0.31	3.64	3.7	-0.1	0.31	3.40	3.5	-0.1
0.33	3.69	3.8	-0.1	0.33	3.47	3.6	-0.2
0.34	3.75	3.9	-0.1	0.34	3.63	3.7	-0.1
0.36	3.87	4.0	-0.1	0.36	3.68	3.8	-0.1
0.38	4.05	4.1	0.0	0.38	3.80	3.9	-0.1
0.40	4.21	4.2	0.1	0.40	3.84	4.0	-0.1
0.41	4.26	4.2	0.1	0.41	3.96	4.0	-0.1
0.43	4.42	4.3	0.1	0.43	4.06	4.1	-0.1
0.45	4.59	4.4	0.2	0.45	4.26	4.2	0.0
0.46	4.67	4.4	0.2	0.46	4.19	4.3	-0.1
0.48	4.70	4.5	0.2	0.48	4.31	4.4	0.0
0.50	4.68	4.6	0.1	0.50	4.38	4.4	-0.1
0.51	4.66	4.6	0.0	0.51	4.46	4.5	0.0
0.53	4.68	4.7	0.0	0.53	4.60	4.6	0.0
0.55	4.73	4.8	-0.1	0.55	4.60	4.7	-0.1
0.56	4.90	4.8	0.1	0.56	4.75	4.7	0.1
0.58	5.00	4.9	0.1	0.58	4.70	4.8	-0.1
0.59	5.07	5.0	0.1	0.59	4.69	4.8	-0.1
0.61	5.09	5.0	0.1	0.61	4.88	4.9	0.0
0.63	5.25	5.1	0.1	0.63	4.81	5.0	-0.2
0.65	5.35	5.2	0.2	0.65	5.04	5.0	0.0
0.66	5.40	5.2	0.2	0.66	5.12	5.1	0.0
0.68	5.40	5.3	0.1	0.68	5.15	5.2	0.0
0.69	5.43	5.3	0.1	0.69	5.32	5.2	0.1
0.71	5.47	5.4	0.1	0.71	5.25	5.3	0.0
0.73	5.45	5.5	0.0	0.73	5.49	5.3	0.2
0.75	5.47	5.5	0.0	0.75	5.42	5.4	0.0
0.76	5.53	5.6	0.0	0.76	5.42	5.4	0.0
0.78	5.64	5.6	0.0	0.78	5.53	5.5	0.0
0.80	5.65	5.7	0.0	0.80	5.60	5.5	0.1
0.81	5.68	5.7	0.0	0.81	5.64	5.6	0.1
0.83	5.71	5.8	-0.1	0.83	5.65	5.6	0.0
0.84	5.80	5.8	0.0	0.84	5.70	5.7	0.0
0.86	5.81	5.8	0.0	0.86	5.70	5.7	0.0
0.88	5.80	5.9	-0.1	0.88	5.79	5.8	0.0
0.90	5.82	6.0	-0.1	0.90	5.87	5.8	0.0
0.91	5.90	6.0	-0.1	0.91	5.83	5.9	0.0
0.93	5.97	6.0	-0.1	0.93	6.03	5.9	0.1
0.94	6.00	6.1	-0.1	0.94	6.00	6.0	0.0
0.96	6.01	6.1	-0.1	0.96	6.16	6.0	0.2
0.98	6.03	6.2	-0.1	0.98	6.16	6.1	0.1
1.00	6.12	6.2	-0.1	1.00	5.95	6.1	-0.2
1.03	6.29	6.3	0.0	1.03	6.10	6.2	-0.1
1.06	6.34	6.4	0.0	1.06	6.18	6.2	-0.1
1.10	6.32	6.4	-0.1	1.10	6.28	6.3	-0.1
1.13	6.34	6.5	-0.2	1.13	6.31	6.4	-0.1
1.16	6.45	6.6	-0.1	1.16	6.69	6.5	0.2
1.19	6.55	6.6	-0.1	1.19	6.77	6.5	0.2
1.23	6.65	6.7	0.0	1.23	6.51	6.6	-0.1
1.26	6.66	6.8	-0.1	1.26	6.53	6.7	-0.1
1.30	6.76	6.8	-0.1	1.30	6.85	6.7	0.1
1.33	6.85	6.9	0.0	1.33	6.98	6.8	0.2
1.36	6.87	6.9	-0.1	1.36	6.91	6.8	0.1
1.39	6.93	7.0	0.0	1.39	6.84	6.9	0.0
1.43	7.01	7.0	0.0	1.43	6.94	6.9	0.0
1.46	7.02	7.1	-0.1	1.46	7.02	7.0	0.0
1.50	7.10	7.1	0.0	1.50	7.05	7.1	0.0
1.53	7.09	7.2	-0.1	1.53	7.09	7.1	0.0
1.56	7.16	7.2	0.0	1.56	7.27	7.1	0.1
1.60	7.21	7.3	0.0	1.60	7.26	7.2	0.1
1.63	7.29	7.3	0.0	1.63	7.15	7.2	-0.1
1.66	7.29	7.3	0.0	1.66	7.21	7.3	-0.1
1.69	7.35	7.4	0.0	1.69	7.40	7.3	0.1
1.73	7.45	7.4	0.0	1.73	7.35	7.3	0.0
1.76	7.42	7.4	0.0	1.76	7.28	7.4	-0.1
1.80	7.51	7.5	0.0	1.80	7.58	7.4	0.2
1.86	7.55	7.5	0.0	1.86	7.49	7.5	0.0
1.93	7.56	7.6	0.0	1.93	7.53	7.5	0.0
2.00	7.69	7.6	0.0	2.00	7.52	7.6	-0.1
2.13	7.88	7.7	0.1	2.13	7.59	7.7	-0.1
2.39	7.96	7.9	0.1	2.39	7.80	7.8	0.0
2.66	8.02	8.0	0.0	2.66	7.92	8.0	-0.1
2.93	8.12	8.1	0.0	2.93	7.96	8.1	-0.1
3.46	8.26	8.2	0.1	3.46	8.36	8.2	0.2
4.00	8.35	8.2	0.1	4.00	8.25	8.2	0.0
5.06	8.37	8.3	0.1	5.06	8.38	8.3	0.1
6.13	8.39	8.3	0.1	6.13	8.24	8.3	-0.1
7.20	8.32	8.3	0.0	7.20	8.31	8.3	0.0
8.26	8.26	8.3	-0.1	8.26	8.32	8.3	0.0
9.33	8.30	8.3	0.0	9.33	8.16	8.3	-0.2
11.46	8.27	8.3	0.0	11.46	8.22	8.3	-0.1

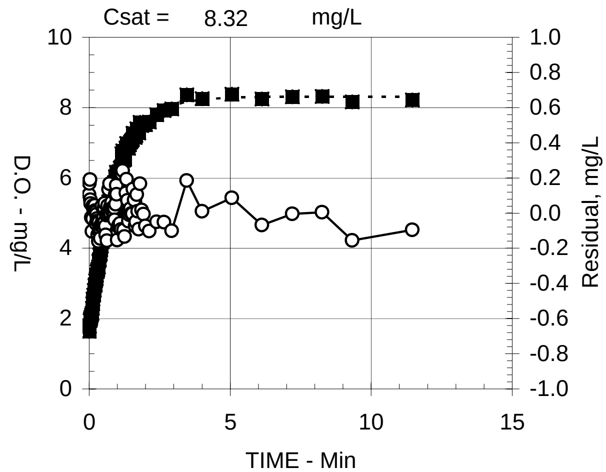
	Probe 1				Probe 2			Probe 3	Probe 4
Lower	19.84%			Lower	19.72%				
Upper	100.89%			Upper	100.77%				
	Value	Abs.Un.	%LSE		Value	Abs.Un.	%LSE		
C*	8.316	0.028	0.332	C*	8.316	0.028	0.339		
C0	1.747	0.028	1.574	C0	1.536	0.028	1.804		
KLaT	68.319	0.014	1.199	KLaT	67.210	0.013	1.179		
Error	0.090			Error	0.092				

PROJECT: Advanced Industrial Aeration - ¾"
DATE: 6/3/2004
RUN: 2.00

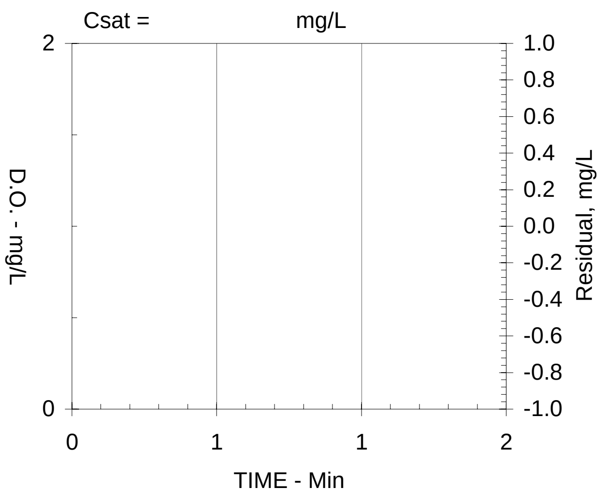
Probe #1



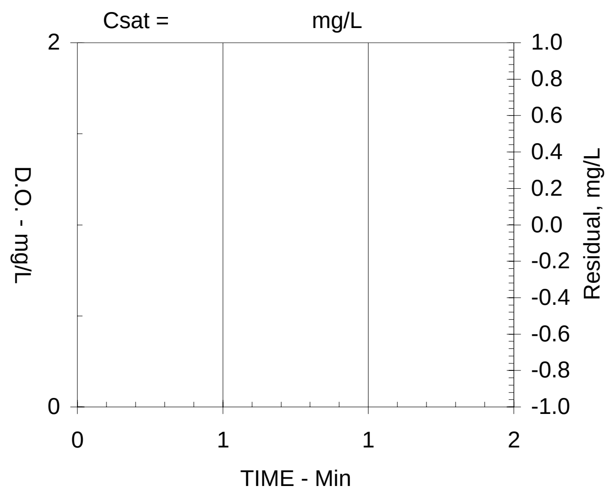
Probe #2



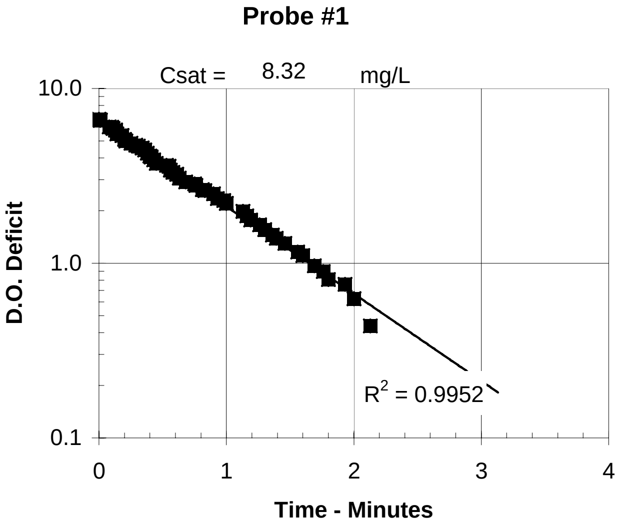
Probe #3

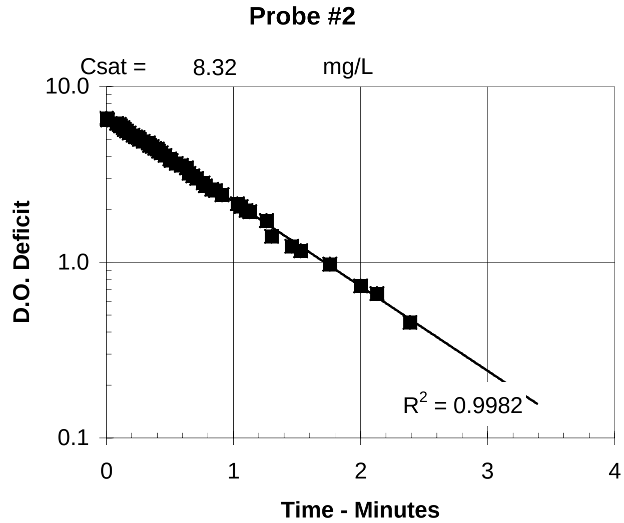


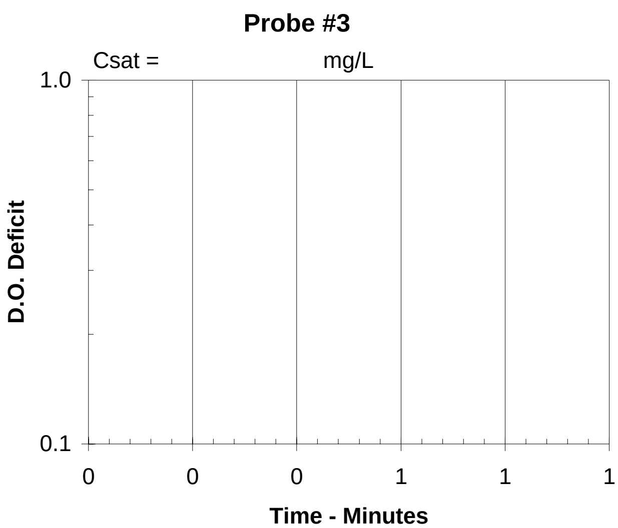
Probe #4

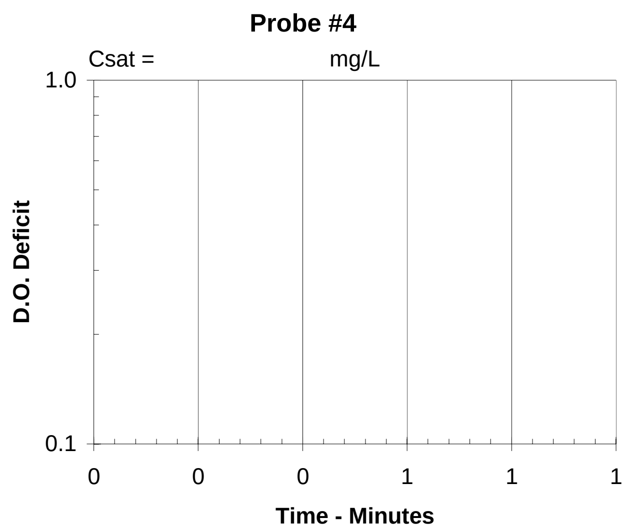


Project: Advanced Industrial Aeration - ¾"
Date: Jun 03, 2004
Run: 2

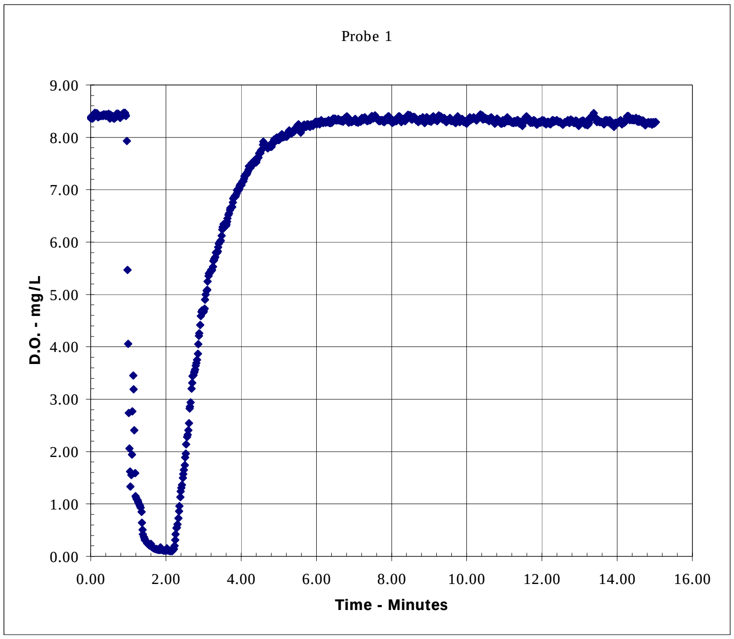


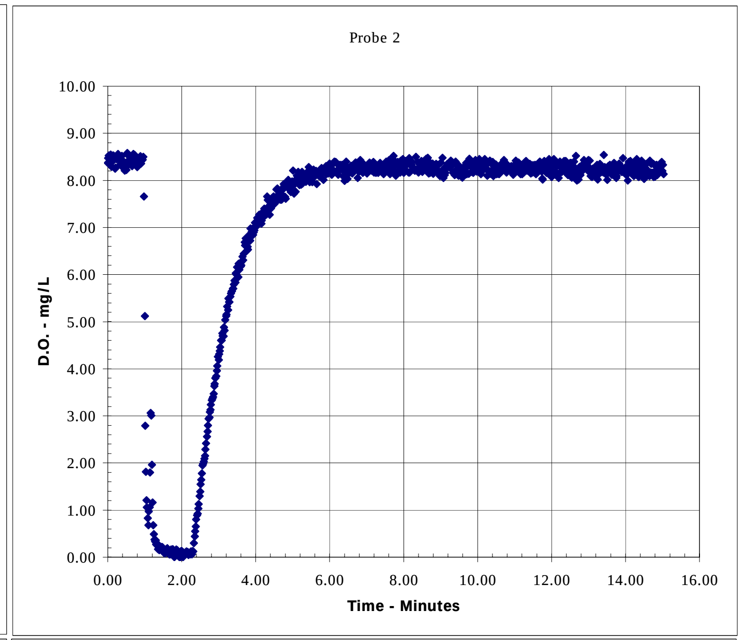






Project: Advanced Industrial Aeration - ¾"
Date: Jun 03, 2004
Run: 2


Probe 1
D.O. - mg/L
Time - Minutes
9.00
8.00
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
0.00
2.00
4.00
6.00
8.00
10.00
12.00
14.00
16.00


Probe 2
D.O. - mg/L
Time - Minutes
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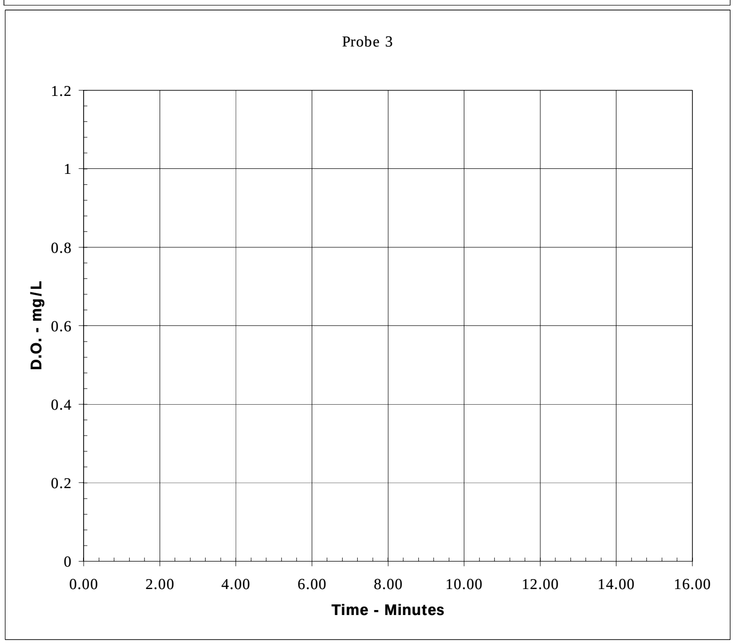
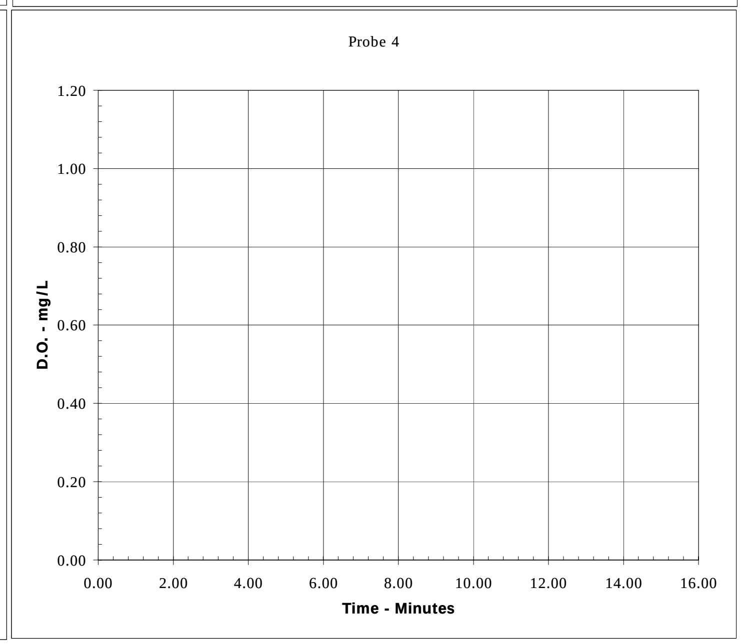
9.00
8.00
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
0.00
2.00
4.00
6.00
8.00
10.00
12.00
14.00
16.00


Probe 3
D.O. - mg/L
Time - Minutes
1.2
1
0.8
0.6
0.4
0.2
0
0.00
2.00
4.00
6.00
8.00
10.00
12.00
14.00
16.00


Probe 4
D.O. - mg/L
Time - Minutes
1.20
1.00
0.80
0.60
0.40
0.20
0.00
0.00
2.00
4.00
6.00
8.00
10.00
12.00
14.00
16.00

GSEE, Inc.
Environmental Services

ASCE OXYGEN TRANSFER DETERMINATION

PROJECT: Advanced Industrial Aeration - ½"
DATE: 3-Jun-04
RUN: 3

599 Waldron Rd.
LaVergne, TN 37086
615/793-7547
FAX 615/793/5070

	Initial	Mid Point	Final			
Barometric Pres. (PSIA)	14.460	14.469	14.470	Average Air Flow (SCFM)		16.006
(mm Hg)	741.90	741.90	741.90	Effective Depth Correction (f)		0.25
Ambient Temperature (°F)	76.10	76.10	76.10	Headloss (In. H_2O)		-48.00
Relative Humidity (%)	73%	73%	73%	C* (mg/l)		8.09
Line Pressure (PSIG)	0.000	0.000	0.000	C_{smT} (Standard Methods, mg/l)		7.98
(In. Hg)	0.00	0.00	0.00	C^*_{20} Standard Conditions		9.36
Line Temperature (°F)	76.10	76.10	76.10	Tank Volume (Ft³)		65.7
Observed Air Flow (CFH)	990	990	990	(Gallons)		491.5
Water Temp. (°C)	26.76	26.93	27.09	(m³)		1.9
Number Of Aeration Devices		1		(Million Pounds)		0.004
Side Water Depth (ft)		5.00	(1.52 m)	#Na_2SO_3 @	250% Stoichiometric	0.66
Air Release Depth (ft)		4.00	(1.22 m)	Cobalt Concen. (mg/l)		0.100
Tank Length (ft)		6.57	(2.00 m)	Grams Cobalt Chloride		0.8
Tank Width (ft)		2.00	(0.61 m)	TDS (mg/L)		765.00
Tank Diameter (ft)		0.00	(0.00 m)			
Gear Reducer or Belt Efficiency		100.0%		Motor Efficiency		89.0%
Pumping Rate, GPM		60.2		Pump Power, HP_{water}		2.28
Mixer Power, HP_{wire}		0.00	(0.00 kw)	Mixer RPM		0.0
Pump Power, HP_{wire} (60% Eff)		4.27	(3.18 kw)	Mixer Power, HP_{water}		0.00
Blower HP_{wire}		0.00	(0.00 kw)	Blower HP_{motor}		0.00
Total HP_{wire} av.		4.27	(3.18 kw)	Total HP_{water} av.		2.28
Gas to Liquid Ratio (V_G/V_L)		1.99				
Injector Inlet Pressure (PSIA)		65.00		Injector Discharge Pressure (PSIA)		65.00

NON-LINEAR REGRESSION RESULTS

Probe	KLaT	KLa20	SOTR	SOTR/Dev	SOTE	SAEwire	C*	Std. Err.
1	54.88	46.57	1.81	1.81	10.89	0.42	8.17	0.0529
2	55.11	46.76	1.78	1.78	10.72	0.42	8.01	0.1143
avg.	55.00	46.66	1.79	1.79	10.81	0.42	8.09	0.0836
TDS	***56.26***	***47.73***	***1.83***	***1.83***	***11.06***	***0.43***	***8.09***	***2.76%***
Corrected	/hr	/hr	#O2/hr		%	#O2/hr-WHP		

OXYGEN TRANSFER

Total SCFM:	**16.0**	**25.733**	**:Nm³/Hr**	**#O2/Hr:**	**1.79**	**0.813**	**:KgO2/Hr**
SCFM/Diff.:	**16.01**	**25.733**	**:Nm³/hr/Diff**	**#O2/Hr/Diff.:**	**1.79**	**0.813**	**:KgO2/Hr/Diff.**
SCFM/KCF:	**243.6**	**13.832**	**:Nm³/hr/m³**	**#O2/Day:**	**43.0**	**19.5**	**:KgO2/Day**
Total ICFM:	**14.1**	**2.70%**	**:%/Ft.**	**#O2/Day/1000 Ft³:**	**655**	**10.49**	**:KgO2/Day/m³**

LINEAR REGRESSION RESULTS

Probe	KLaT	KLa20	SOTR	SOTR/Dev	SOTE	SAEwire	C*	Corr.Coeff.
1	55.13	46.77	1.81	1.81	10.93	0.42	8.16	0.9993
2	54.13	45.93	1.73	1.73	10.45	0.41	7.95	0.9922
avg.	54.63	46.35	1.77	1.77	10.69	0.42	8.05	0.9958
TDS	***55.88***	***47.42***	***1.81***	***1.81***	***10.93***	***0.42***	***8.05***	***2.73%***
Corrected	/hr	/hr	#O2/hr		%	#O2/hr-HPw		

EUROPEAN STANDARD

Probe	KLaT	KLa10	SOTR	SOTR/Dev	SAE	C*
1	55.00	37.43	0.82	0.82	0.26	8.17
2	54.62	37.17	0.80	0.80	0.25	8.01
avg.	54.81	37.30	0.81	0.81	0.25	8.09
	/hr	/hr	kg O2/hr		kg O2/hr-kw	mg/L

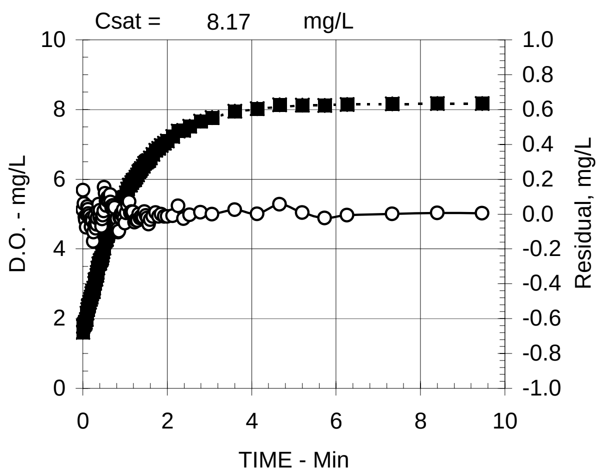
Pt. 1	est.	calc.		Pt. 2	est.	calc.		Pt. 3	lot Used	Pt. 4	lot Used
C0	1.59	1.59		C0	1.66	1.66					
Kla-in	54.88	54.88		Kla-in	55.11	55.11					
C*	8.17	8.17		C*	8.01	8.01					
Sq.Diff.	0.2711			Sq.Diff.	1.2677						

Time	D.O.	D.O.calc	diff	Time	D.O.	D.O.calc	diff
0.00	1.61	1.6	0.0	0.00	1.68	1.7	0.0
0.01	1.78	1.6	0.1	0.01	1.86	1.7	0.1
0.03	1.82	1.8	0.1	0.03	1.83	1.8	0.0
0.05	1.86	1.9	0.0	0.05	1.85	1.9	-0.1
0.06	1.90	1.9	0.0	0.06	1.99	2.0	0.0
0.08	1.98	2.1	-0.1	0.08	2.14	2.1	0.0
0.10	2.16	2.2	0.0	0.10	2.33	2.2	0.1
0.11	2.26	2.2	0.0	0.11	2.38	2.3	0.1
0.13	2.35	2.3	0.0	0.13	2.57	2.4	0.2
0.14	2.38	2.4	0.0	0.14	2.47	2.4	0.0
0.16	2.47	2.5	0.0	0.16	2.64	2.5	0.1
0.18	2.55	2.6	0.0	0.18	2.68	2.6	0.1
0.20	2.61	2.7	-0.1	0.20	2.80	2.7	0.1
0.21	2.71	2.7	0.0	0.21	2.75	2.8	0.0
0.23	2.80	2.8	0.0	0.23	3.05	2.9	0.2
0.25	2.78	2.9	-0.2	0.25	3.04	3.0	0.1
0.26	2.88	3.0	-0.1	0.26	3.06	3.0	0.0
0.28	3.01	3.1	-0.1	0.28	3.12	3.1	0.0
0.29	3.11	3.1	0.0	0.29	3.06	3.1	-0.1
0.31	3.13	3.2	-0.1	0.31	3.11	3.2	-0.1
0.33	3.24	3.3	-0.1	0.33	3.25	3.3	-0.1
0.34	3.32	3.3	0.0	0.34	3.15	3.4	-0.2
0.36	3.45	3.4	0.0	0.36	3.32	3.4	-0.1
0.38	3.58	3.5	0.1	0.38	3.42	3.5	-0.1
0.40	3.59	3.6	0.0	0.40	3.68	3.6	0.1
0.41	3.67	3.6	0.0	0.41	3.59	3.7	-0.1
0.43	3.69	3.7	0.0	0.43	3.62	3.7	-0.1
0.45	3.74	3.8	-0.1	0.45	3.71	3.8	-0.1
0.46	3.82	3.8	0.0	0.46	3.85	3.8	0.0
0.48	3.92	3.9	0.0	0.48	3.69	3.9	-0.2
0.50	4.02	4.0	0.0	0.50	3.96	4.0	0.0
0.51	4.19	4.0	0.2	0.51	4.02	4.0	0.0
0.53	4.23	4.1	0.1	0.53	4.01	4.1	-0.1
0.55	4.26	4.2	0.1	0.55	4.17	4.2	0.0
0.56	4.27	4.2	0.0	0.56	4.16	4.2	-0.1
0.58	4.38	4.3	0.1	0.58	4.14	4.3	-0.1
0.59	4.43	4.3	0.1	0.59	4.27	4.3	0.0
0.61	4.48	4.4	0.1	0.61	4.50	4.4	0.1
0.63	4.57	4.5	0.1	0.63	4.40	4.5	-0.1
0.65	4.65	4.5	0.1	0.65	4.63	4.5	0.1
0.66	4.64	4.6	0.1	0.66	4.44	4.5	-0.1
0.68	4.68	4.6	0.0	0.68	4.66	4.6	0.0
0.69	4.70	4.7	0.0	0.69	4.74	4.6	0.1
0.71	4.78	4.7	0.0	0.71	4.70	4.7	0.0
0.73	4.84	4.8	0.0	0.73	4.57	4.8	-0.2
0.75	4.87	4.9	0.0	0.75	4.82	4.8	0.0
0.76	4.92	4.9	0.0	0.76	4.77	4.9	-0.1
0.78	4.91	4.9	0.0	0.78	4.85	4.9	-0.1
0.80	4.94	5.0	-0.1	0.80	4.92	5.0	0.0
0.81	5.00	5.0	0.0	0.81	5.07	5.0	0.1
0.83	5.00	5.1	-0.1	0.83	5.01	5.0	0.0
0.84	5.01	5.1	-0.1	0.84	5.15	5.1	0.1
0.86	5.07	5.2	-0.1	0.86	5.13	5.1	0.0
0.88	5.21	5.2	0.0	0.88	5.01	5.2	-0.2
0.90	5.26	5.3	0.0	0.90	5.16	5.2	-0.1
0.91	5.31	5.3	0.0	0.91	5.22	5.3	0.0
0.93	5.36	5.4	0.0	0.93	5.43	5.3	0.1
0.94	5.39	5.4	0.0	0.94	5.24	5.3	-0.1
0.96	5.46	5.4	0.0	0.96	5.41	5.4	0.0
0.98	5.46	5.5	0.0	0.98	5.47	5.4	0.0
1.00	5.48	5.5	-0.1	1.00	5.48	5.5	0.0
1.03	5.61	5.6	0.0	1.03	5.49	5.5	-0.1
1.06	5.72	5.7	0.0	1.06	5.69	5.6	0.1
1.10	5.83	5.8	0.1	1.10	5.67	5.7	0.0
1.13	5.83	5.8	0.0	1.13	5.51	5.8	-0.3
1.16	5.91	5.9	0.0	1.16	5.87	5.8	0.0
1.19	5.97	6.0	0.0	1.19	6.00	5.9	0.1
1.23	5.99	6.0	0.0	1.23	6.02	6.0	0.1
1.26	6.06	6.1	0.0	1.26	6.12	6.0	0.1
1.30	6.13	6.2	0.0	1.30	6.10	6.1	0.0
1.33	6.22	6.2	0.0	1.33	6.03	6.1	-0.1
1.36	6.25	6.3	0.0	1.36	6.42	6.2	0.2
1.39	6.31	6.3	0.0	1.39	6.42	6.2	0.2
1.43	6.37	6.4	0.0	1.43	6.33	6.3	0.0
1.46	6.45	6.4	0.0	1.46	6.24	6.3	-0.1
1.50	6.49	6.5	0.0	1.50	6.47	6.4	0.1
1.53	6.52	6.5	0.0	1.53	6.51	6.5	0.1
1.56	6.53	6.6	-0.1	1.56	6.65	6.5	0.2
1.60	6.61	6.6	0.0	1.60	6.82	6.5	0.3
1.66	6.72	6.7	0.0	1.66	6.60	6.6	0.0
1.73	6.83	6.8	0.0	1.73	6.70	6.7	0.0
1.80	6.89	6.9	0.0	1.80	6.86	6.8	0.1
1.86	6.97	7.0	0.0	1.86	7.17	6.9	0.3
1.93	7.03	7.0	0.0	1.93	7.14	6.9	0.2
2.00	7.10	7.1	0.0	2.00	7.13	7.0	0.1
2.13	7.22	7.2	0.0	2.13	7.07	7.1	0.0
2.26	7.38	7.3	0.0	2.26	7.06	7.2	-0.2
2.39	7.40	7.4	0.0	2.39	7.35	7.3	0.1
2.53	7.52	7.5	0.0	2.53	7.16	7.4	-0.2
2.79	7.67	7.7	0.0	2.79	7.43	7.5	-0.1
3.06	7.77	7.8	0.0	3.06	7.69	7.6	0.1
3.60	7.95	7.9	0.0	3.60	7.68	7.8	-0.1
4.13	8.02	8.0	0.0	4.13	7.86	7.9	0.0
4.66	8.13	8.1	0.1	4.66	7.84	7.9	-0.1
5.20	8.12	8.1	0.0	5.20	7.94	8.0	0.0
5.73	8.11	8.1	0.0	5.73	7.84	8.0	-0.1
6.26	8.14	8.2	0.0	6.26	7.87	8.0	-0.1
7.33	8.16	8.2	0.0	7.33	7.94	8.0	-0.1
8.40	8.17	8.2	0.0	8.40	7.91	8.0	-0.1
9.46	8.17	8.2	0.0	9.46	8.28	8.0	0.3

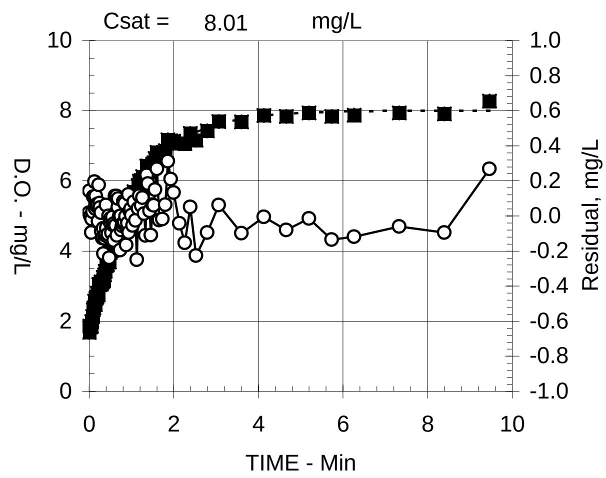
	Probe 1				Probe 2			Probe 3	Probe 4
Lower	19.71%			Lower	21.00%				
Upper	100.04%			Upper	103.33%				
	Value	Abs.Un.	%LSE		Value	Abs.Un.	%LSE		
C*	8.172	0.017	0.209	C*	8.009	0.037	0.459		
C0	1.586	0.015	0.943	C0	1.663	0.032	1.946		
KLaT	54.883	0.006	0.700	KLaT	55.108	0.014	1.571		
Error	0.053			Error	0.114				

PROJECT:	Advanced Industrial Aeration - ½"
DATE:	6/3/2004
RUN:	3.00

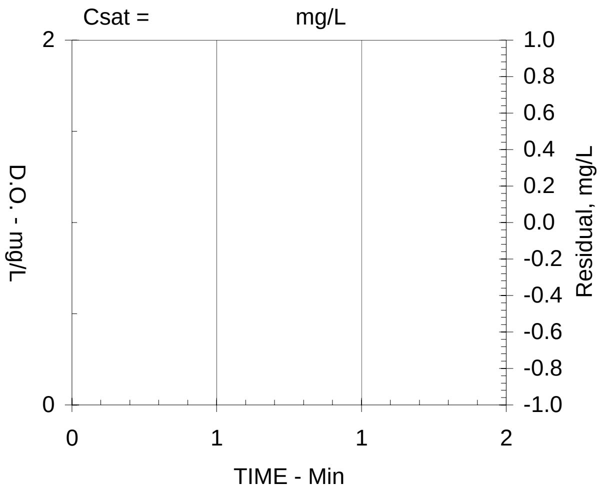
Probe #1



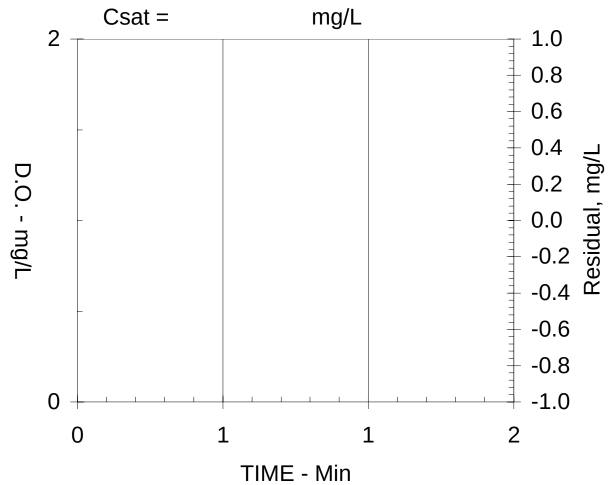
Probe #2



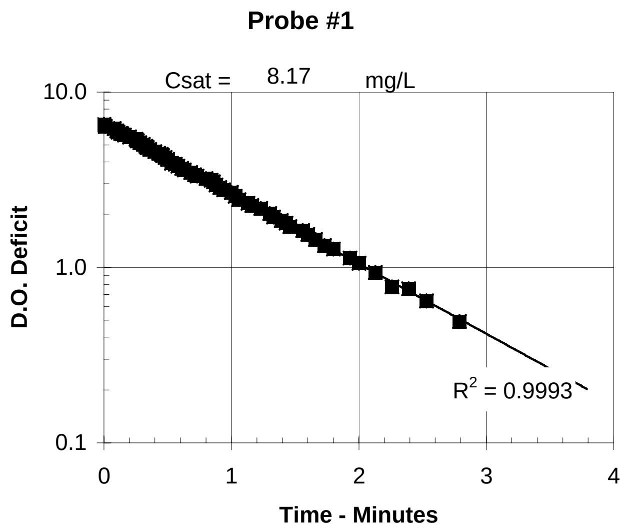
Probe #3

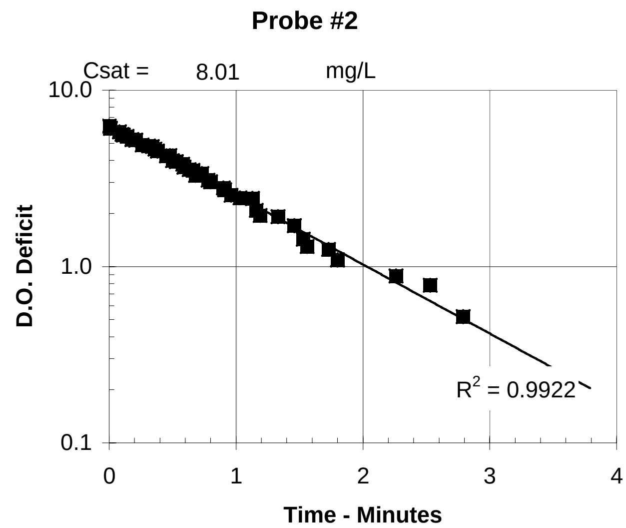


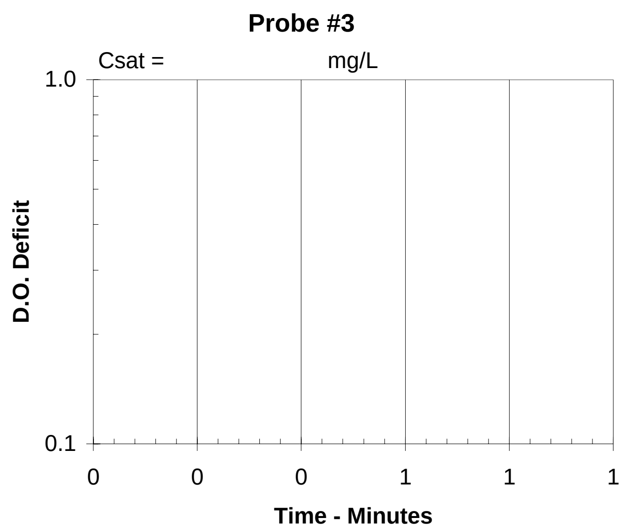
Probe #4

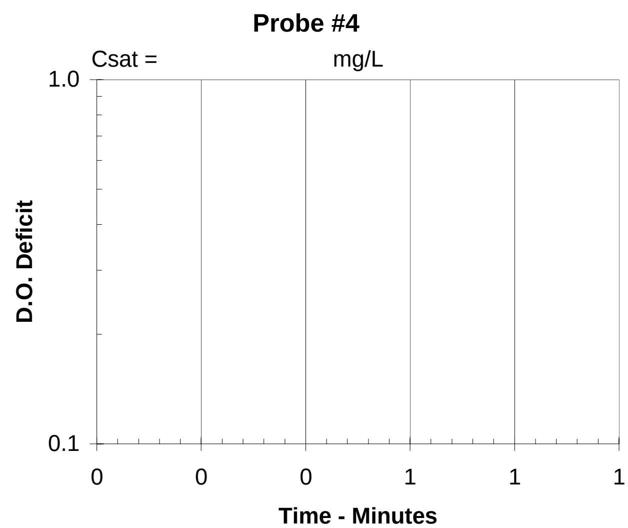


Project: Advanced Industrial Aeration - ½"
Date: Jun 03, 2004
Run: 3

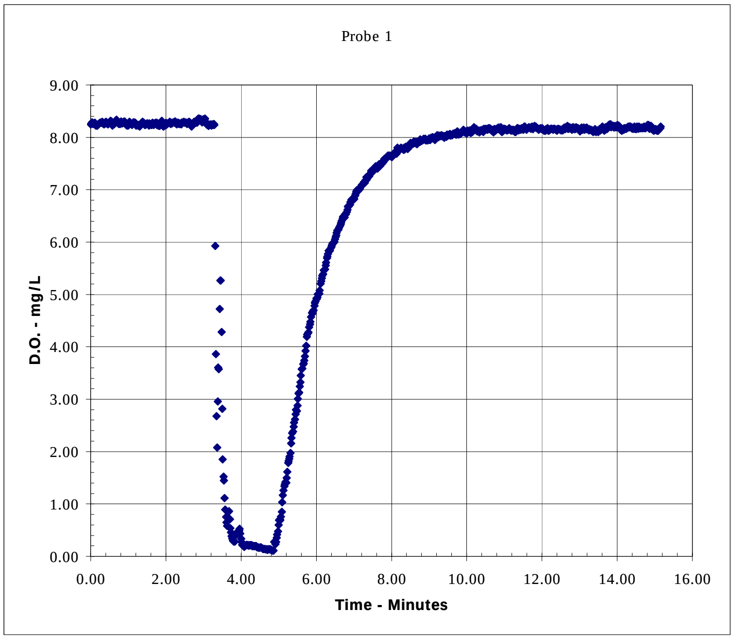


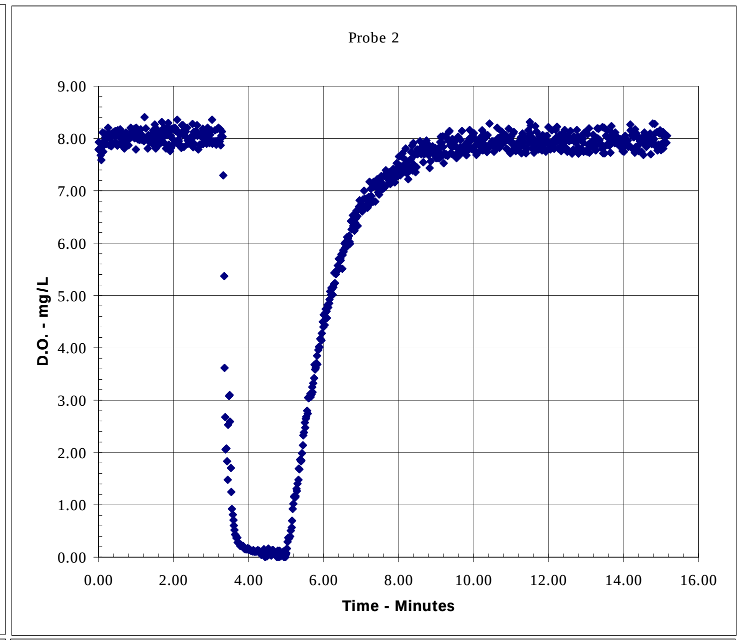


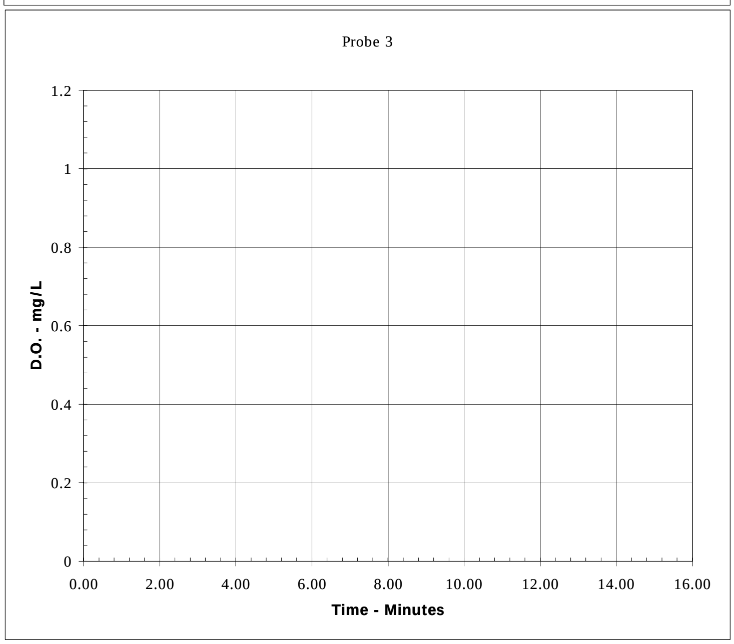


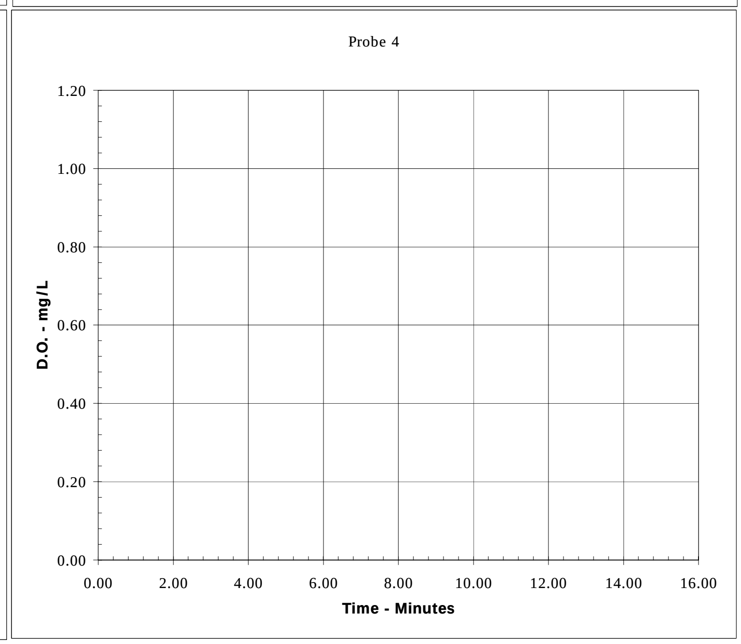


Project: Advanced Industrial Aeration - ½"
Date: Jun 03, 2004
Run: 3


Probe 1
9.00
8.00
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
D.O. - mg/L
0.00
2.00
4.00
6.00
8.00
10.00
12.00
14.00
16.00
Time - Minutes


Probe 2
9.00
8.00
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
D.O. - mg/L
0.00
2.00
4.00
6.00
8.00
10.00
12.00
14.00
16.00
Time - Minutes


Probe 3
1.2
1
0.8
0.6
0.4
0.2
0
D.O. - mg/L
0.00
2.00
4.00
6.00
8.00
10.00
12.00
14.00
16.00
Time - Minutes


Probe 4
1.20
1.00
0.80
0.60
0.40
0.20
0.00
D.O. - mg/L
0.00
2.00
4.00
6.00
8.00
10.00
12.00
14.00
16.00
Time - Minutes

GSEE, Inc.

Environmental Services

ASCE OXYGEN TRANSFER DETERMINATION

PROJECT: Advanced Industrial Aeration - ½"
DATE: 3-Jun-04
RUN: 4

599 Waldron Rd.
LaVergne, TN 37086
615/793-7547
FAX 615/793/5070

	Initial	Mid Point	Final			
Barometric Pres. (PSIA)	14.460	14.469	14.470	Average Air Flow (SCFM)		11.933
(mm Hg)	741.90	741.80	741.80	Effective Depth Correction (f)		0.30
Ambient Temperature (°F)	76.30	76.20	76.10	Headloss (In. H_2O)		-48.00
Relative Humidity (%)	70%	70%	71%	C* (mg/l)		8.01
Line Pressure (PSIG)	0.000	0.000	0.000	$C_{sm}T$ (Standard Methods, mg/l)		7.86
(In. Hg)	0.00	0.00	0.00	C^*_{20} Standard Conditions		9.41
Line Temperature (°F)	76.30	76.20	76.10	Tank Volume (Ft³)		65.7
Observed Air Flow (CFH)	738	738	738	(Gallons)		491.5
Water Temp. (°C)	27.40	27.75	28.05	(m³)		1.9
Number Of Aeration Devices		1		(Million Pounds)		0.004
Side Water Depth (ft)		5.00	(1.52 m)	#Na_2SO_3 @	250% Stoichiometric	0.65
Air Release Depth (ft)		4.00	(1.22 m)	Cobalt Concen. (mg/l)		0.100
Tank Length (ft)		6.57	(2.00 m)	Grams Cobalt Chloride		0.8
Tank Width (ft)		2.00	(0.61 m)	TDS (mg/L)		943.00
Tank Diameter (ft)		0.00	(0.00 m)			
Gear Reducer or Belt Efficiency		100.0%		Motor Efficiency		89.0%
Pumping Rate, GPM		52.8		Pump Power, HP_{water}		1.54
Mixer Power, HP_{wire}		0.00	(0.00 kw)	Mixer RPM		0.0
Pump Power, HP_{wire} (60% Eff)		2.88	(2.15 kw)	Mixer Power, HP_{water}		0.00
Blower HP_{wire}		0.00	(0.00 kw)	Blower HP_{motor}		0.00
Total HP_{wire} av.		2.88	(2.15 kw)	Total HP_{water} av.		1.54
Gas to Liquid Ratio (V_G/V_L)		1.69				
Injector Inlet Pressure (PSIA)		50.00		Injector Discharge Pressure (PSIA)		50.00

NON-LINEAR REGRESSION RESULTS

Probe	K_La_T	K_La_{20}	SOTR	SOTR/Dev	SOTE	SAE_{wire}	C*	Std. Err.
1	40.32	33.56	1.29	1.29	10.43	0.45	7.97	0.0454
2	40.27	33.52	1.30	1.30	10.52	0.45	8.05	0.1076
avg.	40.29	33.54	1.29	1.29	10.47	0.45	8.01	0.0765
TDS	***40.52***	***33.73***	***1.30***	***1.30***	***10.53***	***0.45***	***8.01***	***2.63%***
Corrected	/hr	/hr	#O2/hr		%	#O2/hr-WHP		

OXYGEN TRANSFER

Total SCFM:	**11.9**	**19.185**	**:Nm³/Hr**	**#O2/Hr:**	**1.29**	**0.587**	**:KgO2/Hr**
SCFM/Diff.:	**11.93**	**19.185**	**:Nm³/hr/Diff**	**#O2/Hr/Diff.:**	**1.29**	**0.587**	**:KgO2/Hr/Diff.**
SCFM/KCF:	**181.6**	**10.312**	**:Nm³/hr/m³**	**#O2/Day:**	**31.1**	**14.1**	**:KgO2/Day**
Total ICFM:	**10.5**	**2.62%**	**:%/Ft.**	**#O2/Day/1000 Ft³:**	**473**	**7.57**	**:KgO2/Day/m³**

LINEAR REGRESSION RESULTS

Probe	K_La_T	K_La_{20}	SOTR	SOTR/Dev	SOTE	SAE_{wire}	C*	Corr.Coeff.
1	42.35	35.26	1.34	1.34	10.88	0.47	7.92	0.9992
2	40.58	33.78	1.30	1.30	10.48	0.45	7.96	0.9951
avg.	41.47	34.52	1.32	1.32	10.68	0.46	7.94	0.9971
TDS	***41.69***	***34.71***	***1.33***	***1.33***	***10.74***	***0.46***	***7.94***	***2.68%***
Corrected	/hr	/hr	#O2/hr		%	#O2/hr-HPw		

EUROPEAN STANDARD

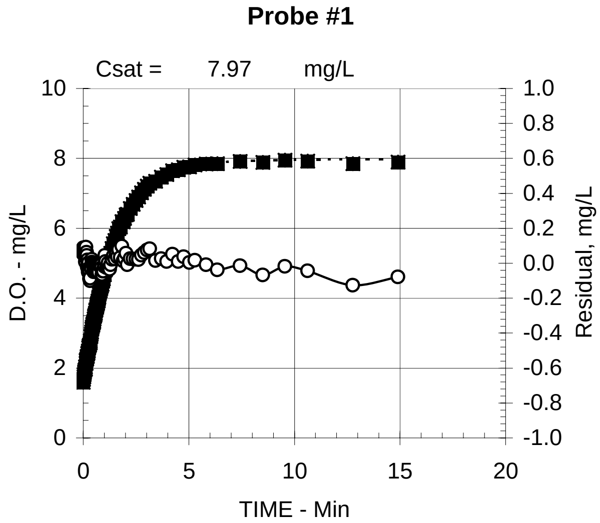
Probe	K_La_T	K_La_{10}	SOTR	SOTR/Dev	SAE	C*
1	41.34	27.62	0.60	0.60	0.28	7.97
2	40.42	27.01	0.59	0.59	0.28	8.05
avg.	40.88	27.31	0.60	0.60	0.28	8.01
	/hr	/hr	kg O_2/hr		kg O_2/hr-kw	mg/L

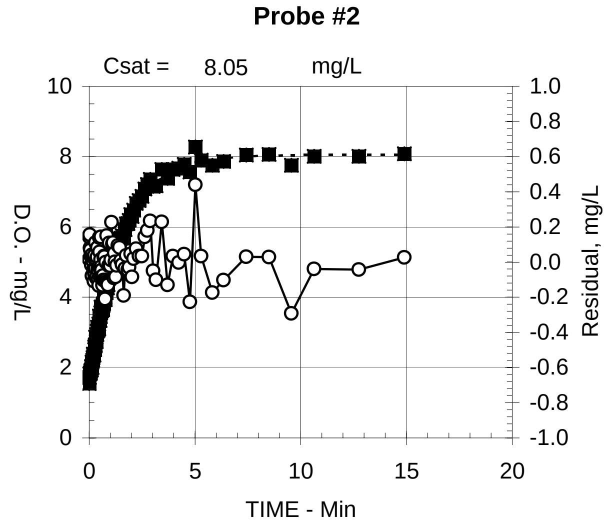
Pt. 1	est.	calc.		Pt. 2	est.	calc.		Pt. 3	lot Used	Pt. 4	lot Used
C0	1.54	1.54		C0	1.54	1.54					
Kla-in	40.32	40.32		Kla-in	40.27	40.27					
C*	7.97	7.97		C*	8.05	8.05					
Sq.Diff.	0.2001			Sq.Diff.	1.1241						

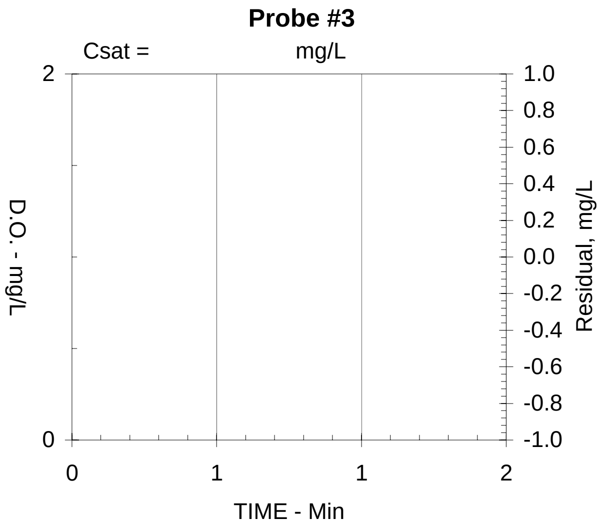
Time	D.O.	D.O.calc	diff	Time	D.O.	D.O.calc	diff
0.00	1.60	1.5	0.1	0.00	1.55	1.5	0.0
0.01	1.68	1.6	0.1	0.01	1.72	1.6	0.1
0.03	1.75	1.7	0.1	0.03	1.82	1.7	0.2
0.05	1.81	1.8	0.1	0.05	1.83	1.8	0.1
0.06	1.88	1.8	0.1	0.06	1.86	1.8	0.1
0.08	1.93	1.9	0.0	0.08	1.91	1.9	0.0
0.10	1.97	2.0	0.0	0.10	1.94	2.0	0.0
0.11	2.04	2.0	0.0	0.11	2.03	2.0	0.0
0.13	2.14	2.1	0.1	0.13	2.00	2.1	-0.1
0.14	2.21	2.1	0.1	0.14	2.16	2.1	0.0
0.16	2.26	2.2	0.1	0.16	2.21	2.2	0.0
0.18	2.32	2.3	0.0	0.18	2.28	2.3	0.0
0.20	2.33	2.4	0.0	0.20	2.38	2.4	0.0
0.21	2.41	2.4	0.0	0.21	2.35	2.4	0.0
0.23	2.44	2.5	0.0	0.23	2.36	2.5	-0.1
0.25	2.49	2.5	-0.1	0.25	2.58	2.5	0.0
0.26	2.58	2.6	0.0	0.26	2.51	2.6	-0.1
0.28	2.62	2.6	0.0	0.28	2.62	2.7	0.0
0.29	2.64	2.7	0.0	0.29	2.65	2.7	0.0
0.31	2.66	2.8	-0.1	0.31	2.87	2.8	0.1
0.33	2.72	2.8	-0.1	0.33	2.74	2.8	-0.1
0.34	2.77	2.9	-0.1	0.34	2.87	2.9	0.0
0.36	2.90	2.9	0.0	0.36	2.94	2.9	0.0
0.38	2.97	3.0	0.0	0.38	3.03	3.0	0.0
0.40	3.03	3.1	0.0	0.40	3.15	3.1	0.1
0.41	3.12	3.1	0.0	0.41	3.06	3.1	0.0
0.43	3.16	3.2	0.0	0.43	3.07	3.2	-0.1
0.45	3.22	3.2	0.0	0.45	3.10	3.2	-0.1
0.46	3.25	3.3	0.0	0.46	3.24	3.3	0.0
0.48	3.30	3.3	0.0	0.48	3.47	3.3	0.1
0.50	3.33	3.4	0.0	0.50	3.45	3.4	0.1
0.51	3.41	3.4	0.0	0.51	3.34	3.4	-0.1
0.53	3.47	3.5	0.0	0.53	3.45	3.5	0.0
0.55	3.50	3.5	0.0	0.55	3.56	3.5	0.0
0.56	3.53	3.6	0.0	0.56	3.72	3.6	0.1
0.58	3.58	3.6	0.0	0.58	3.61	3.6	0.0
0.59	3.64	3.6	0.0	0.59	3.62	3.7	0.0
0.61	3.67	3.7	0.0	0.61	3.64	3.7	-0.1
0.63	3.73	3.8	0.0	0.63	3.65	3.8	-0.1
0.65	3.79	3.8	0.0	0.65	3.76	3.8	-0.1
0.66	3.84	3.8	0.0	0.66	3.79	3.9	-0.1
0.68	3.86	3.9	0.0	0.68	3.82	3.9	-0.1
0.69	3.91	3.9	0.0	0.69	3.98	4.0	0.0
0.71	3.93	4.0	-0.1	0.71	4.04	4.0	0.0
0.73	4.00	4.0	0.0	0.73	4.09	4.1	0.0
0.75	4.04	4.1	-0.1	0.75	4.01	4.1	-0.1
0.76	4.11	4.1	0.0	0.76	3.93	4.1	-0.2
0.78	4.15	4.2	0.0	0.78	4.19	4.2	0.0
0.80	4.21	4.2	0.0	0.80	4.13	4.2	-0.1
0.83	4.28	4.3	0.0	0.83	4.47	4.3	0.2
0.86	4.34	4.4	0.0	0.86	4.27	4.4	-0.1
0.90	4.40	4.5	-0.1	0.90	4.36	4.5	-0.1
0.93	4.49	4.5	0.0	0.93	4.54	4.6	0.0
0.96	4.55	4.6	0.0	0.96	4.74	4.6	0.1
1.00	4.67	4.7	0.0	1.00	4.70	4.7	0.0
1.03	4.80	4.8	0.0	1.03	4.80	4.8	0.0
1.06	4.83	4.8	0.0	1.06	5.08	4.9	0.2
1.10	4.88	4.9	0.0	1.10	5.04	4.9	0.1
1.13	4.95	5.0	0.0	1.13	5.11	5.0	0.1
1.16	5.02	5.0	0.0	1.16	4.97	5.1	-0.1
1.19	5.08	5.1	0.0	1.19	5.17	5.1	0.0
1.23	5.13	5.2	0.0	1.23	5.20	5.2	0.0
1.26	5.18	5.2	0.0	1.26	5.17	5.3	-0.1
1.30	5.28	5.3	0.0	1.30	5.31	5.3	0.0
1.36	5.42	5.4	0.0	1.36	5.53	5.4	0.1
1.43	5.55	5.5	0.0	1.43	5.64	5.6	0.1
1.50	5.65	5.6	0.0	1.50	5.68	5.7	0.0
1.56	5.77	5.7	0.0	1.56	5.75	5.8	0.0
1.63	5.86	5.8	0.0	1.63	5.68	5.9	-0.2
1.69	5.99	5.9	0.1	1.69	5.92	6.0	0.0
1.76	6.03	6.0	0.0	1.76	6.09	6.1	0.0
1.83	6.19	6.1	0.1	1.83	6.10	6.1	0.0
1.89	6.18	6.2	0.0	1.89	6.19	6.2	0.0
1.96	6.28	6.3	0.0	1.96	6.35	6.3	0.0
2.03	6.39	6.3	0.1	2.03	6.30	6.4	-0.1
2.10	6.40	6.4	0.0	2.10	6.48	6.5	0.0
2.23	6.56	6.5	0.0	2.23	6.67	6.6	0.1
2.36	6.68	6.7	0.0	2.36	6.75	6.7	0.0
2.50	6.80	6.8	0.0	2.50	6.87	6.8	0.0
2.63	6.90	6.9	0.0	2.63	7.08	6.9	0.1
2.76	7.01	7.0	0.0	2.76	7.21	7.0	0.2
2.89	7.11	7.1	0.1	2.89	7.35	7.1	0.2
3.03	7.21	7.1	0.1	3.03	7.15	7.2	-0.1
3.16	7.29	7.2	0.1	3.16	7.17	7.3	-0.1
3.43	7.35	7.3	0.0	3.43	7.63	7.4	0.2
3.70	7.46	7.4	0.0	3.70	7.38	7.5	-0.1
3.96	7.53	7.5	0.0	3.96	7.63	7.6	0.0
4.23	7.65	7.6	0.1	4.23	7.67	7.7	0.0
4.50	7.67	7.7	0.0	4.50	7.78	7.7	0.0
4.76	7.75	7.7	0.0	4.76	7.56	7.8	-0.2
5.03	7.76	7.8	0.0	5.03	8.27	7.8	0.4
5.29	7.81	7.8	0.0	5.29	7.90	7.9	0.0
5.83	7.84	7.8	0.0	5.83	7.75	7.9	-0.2
6.36	7.85	7.9	0.0	6.36	7.86	8.0	-0.1
7.43	7.91	7.9	0.0	7.43	8.04	8.0	0.0
8.50	7.89	8.0	-0.1	8.50	8.06	8.0	0.0
9.56	7.94	8.0	0.0	9.56	7.75	8.0	-0.3
10.63	7.92	8.0	0.0	10.63	8.01	8.0	0.0
12.76	7.85	8.0	-0.1	12.76	8.01	8.1	0.0
14.90	7.90	8.0	-0.1	14.90	8.08	8.1	0.0

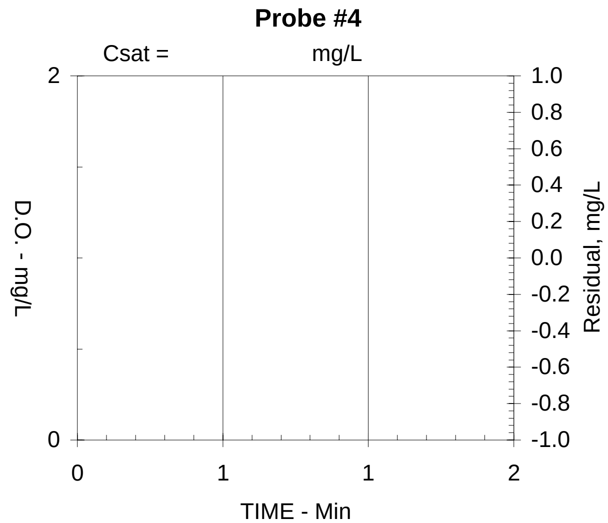
	Probe 1				Probe 2			Probe 3	Probe 4
Lower	20.02%			Lower	19.25%				
Upper	99.63%			Upper	102.69%				
	Value	Abs.Un.	%LSE		Value	Abs.Un.	%LSE		
C*	7.974	0.013	0.168	C*	8.054	0.032	0.395		
C0	1.544	0.012	0.750	C0	1.535	0.027	1.787		
KLaT	40.321	0.004	0.614	KLaT	40.267	0.010	1.437		
Error	0.045			Error	0.108				

PROJECT:	American Industrial Aeration - ½"
DATE:	6/3/2004
RUN:	4.00

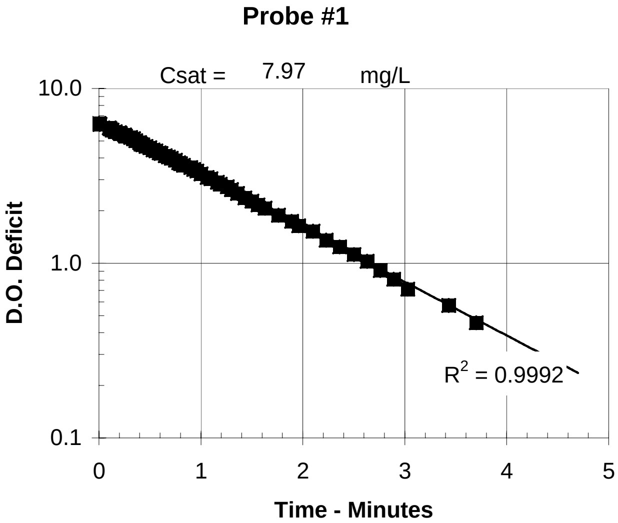


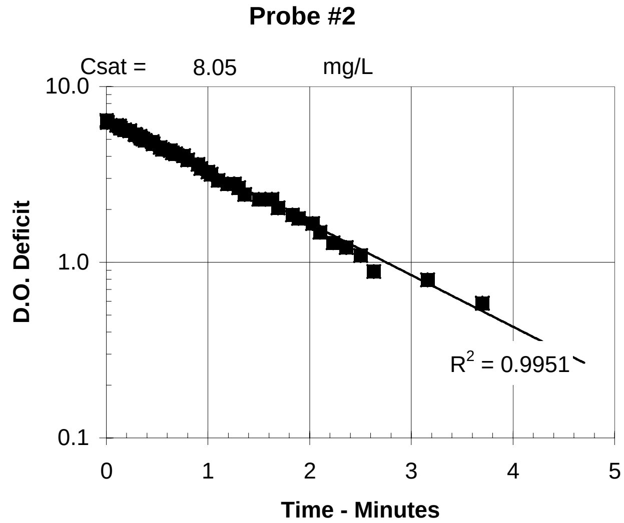


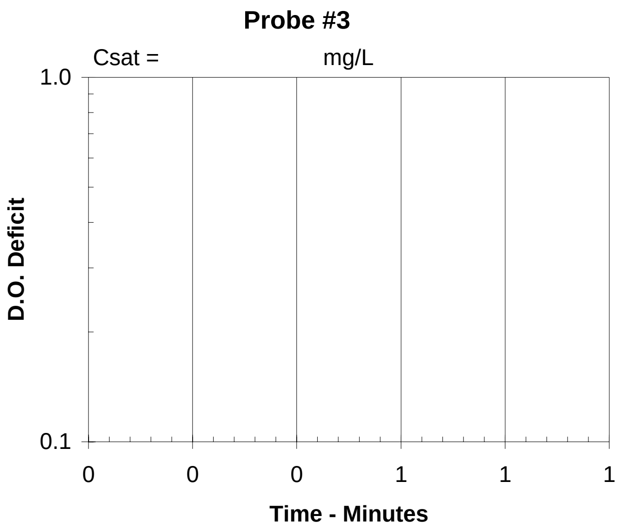


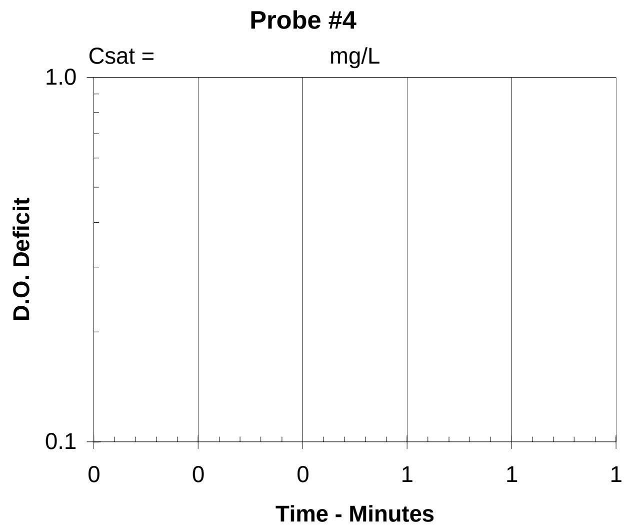


Project: American Industrial Aeration - ½"
Date: Jun 03, 2004
Run: 4

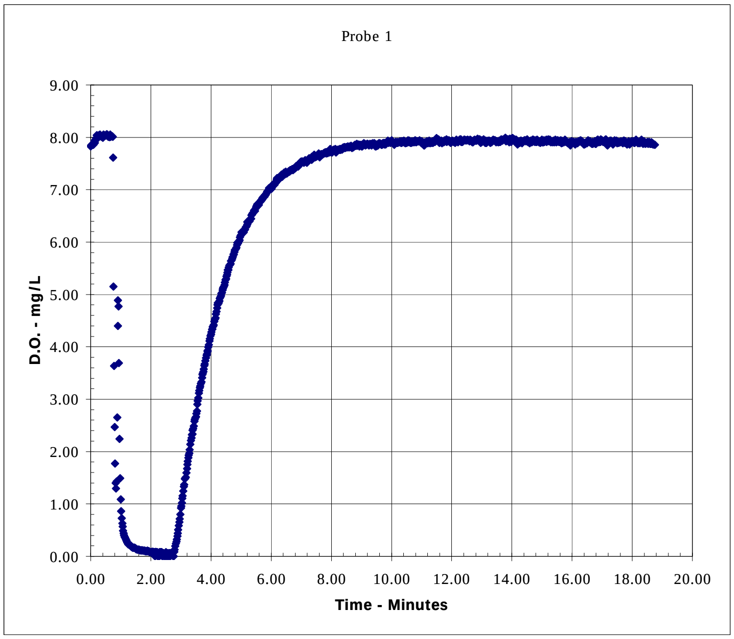


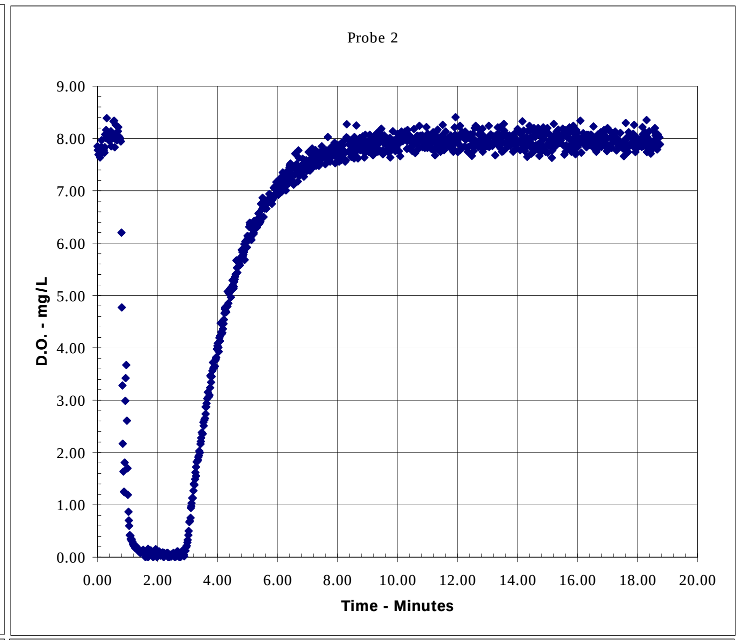


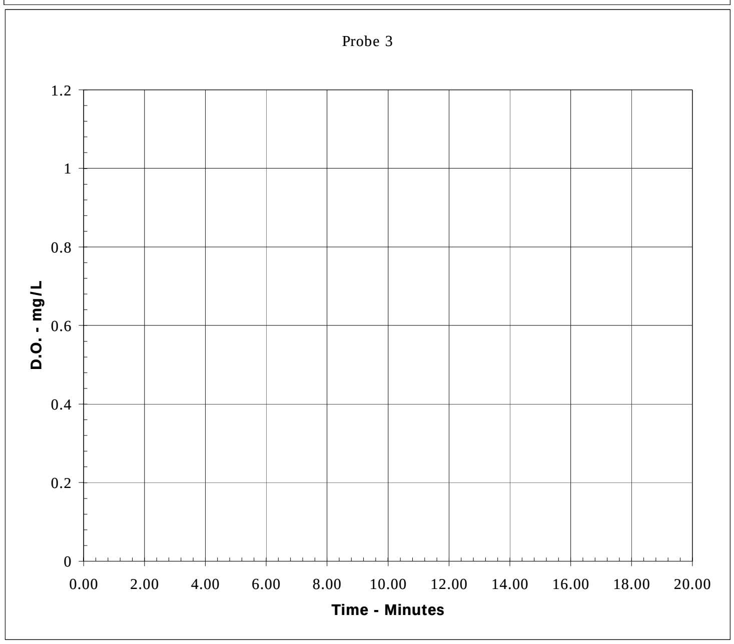


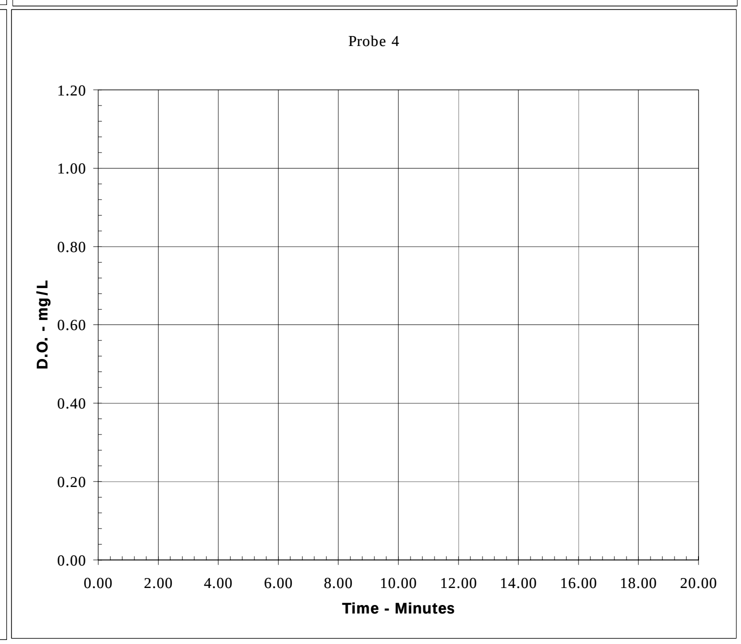


Project: American Industrial Aeration - ½"
Date: Jun 03, 2004
Run: 4


Probe 1
D.O. - mg/L
Time - Minutes


Probe 2
D.O. - mg/L
Time - Minutes


Probe 3
D.O. - mg/L
Time - Minutes


Probe 4
D.O. - mg/L
Time - Minutes