

WASTEWATER TECHNOLOGY

Report on Evaluation of
Aquarobic International
Mini-Plant Model F54291-5

MINI-PLANT
SEQUENTIAL BATCH
TEST DATA:
FROM: 4 / 11 / 1993
TO: 11 / 2 / 1993

under the provisions of
NSF Standard No. 40
on Individual Home
Aerobic Wastewater
Treatment Plants



**NSF. I. CLASS 1
AQUAROBIC
CLAS 1-A**

NSF International
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PO Box 130140
Ann Arbor, Michigan 48113-0140 USA

Report on the Performance Evaluation of the
Aquarobic International Mini-Plant
Model F-54291-5

Under the Provisions of ANSI/NSF Standard 40
Relating to Individual Aerobic Wastewater Treatment Plants

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(less than 00

November 1993

EXECUTIVE SUMMARY

Testing of the Aquarobic International Mini-Plant Model F-54291-5 was conducted under the provisions of NSF Standard 40 for Individual Aerobic Wastewater Treatment Plants (July 1990 revision). NSF Standard 40 was developed by the NSF Joint Committee on Wastewater Technology.

The performance evaluation was conducted at the NSF Wastewater Technology Test Facility in Chelsea, Michigan, using wastewater diverted from the Chelsea municipal wastewater collection system. The evaluation consisted of six months of testing, during which a seven week stress test was conducted. The evaluation consisted of three weeks of dosing without sampling to allow for plant start-up, sixteen weeks of dosing at design flow, seven weeks of stress test and four weeks of dosing at design flow. Sampling started in the spring and continued through the summer and into fall, covering a full range of operating temperatures.

Standard 40, in Section H. (3) of Appendix A, provides for exclusion of up to ten percent of the effluent sample days, not to exceed one during stress testing, in completing the pass/fail determination. No sample days were discarded in determining if the plant met the pass/fail criteria. The average effluent BOD₅ was 7 mg/L, ranging between <5 and 21 mg/L, and the average effluent suspended solids was 14 mg/L, ranging between <5 and 83 mg/L. Over the course of the evaluation, the pH ranged from 7.5 to 8.9.

The Aquarobic Model F-54291-5 produced an effluent that successfully met the performance requirements established by NSF Standard 40 for Class I effluent:

The maximum arithmetic mean of seven consecutive sample days was 11 mg/L for BOD₅ and 25 mg/L for suspended solids, both well below the allowed maximum of 45 mg/L. The maximum arithmetic mean of 30 consecutive sample days was 9 mg/L for BOD₅ and 19 mg/L for suspended solids, both well below the allowed maximum of 30 mg/L. Removal rates ranged from 94 to 97 percent for BOD₅ and 91 to 95 percent for suspended solids, above the requirement of 85 percent.

The effluent pH during the entire evaluation ranged between 7.5 and 8.9, within the required range of 6.0 to 9.0. The Aquarobic Model F-54291-5 also met the requirements for noise levels (less than 60 dbA at a distance of 20 feet) and color, threshold odor, oily film and foam.

PREFACE

Performance evaluation of individual aerobic wastewater treatment plants is achieved within the provisions of NSF Standard 40: Individual Aerobic Wastewater Treatment Plants (revised July 1990), prepared by the NSF Joint Committee on Wastewater Technology and adopted by the NSF Board of Trustees.

Conformance with the standard is recognized by issuance of the NSF Mark. This is not to be construed as an approval of the equipment but rather a certification of the data provided by the test and an indication of compliance with the requirements expressed in the Standard.

Plants conforming to Standard 40 are classified as Class I or Class II plants according to the quality of effluent produced by the plant during their performance evaluation. Class I plants must also demonstrate performance consistent with the effluent color, odor, oily film and foam requirements of the standard. Class I plants must satisfy the requirements of meeting EPA Secondary Treatment Guidelines² for five day biochemical oxygen demand, suspended solids and pH.

Permission to use the NSF Mark is granted only after the equipment has been tested and found to perform satisfactorily, and all other requirements of the standard have been satisfied. Continued use of the Mark is dependent upon evidence of compliance with the Standard and NSF General and Program Specific Policies as determined by periodic reinspection of the equipment at the factory, distributors and reports from the field.

NSF Standard 40 requires the testing laboratory to provide the manufacturer of an individual aerobic wastewater treatment plant a report including significant data and appropriate commentary relative to the performance evaluation of the plant. NSF policy specifies provision of performance evaluation reports to appropriate state regulatory agencies at publication. Subsequent direct distribution of the report by NSF is made only at the specific request of or by permission of the manufacturer.

The following report contains results of the entire testing program, a description of the plant, its operation and key process control equipment, and a narrative summary of the test program, including test location, procedures and significant occurrences. The plant represented herein reflects the equipment authorized to bear the NSF Mark.

CERTIFICATION

NSF *International* has determined by performance evaluation under the provisions of NSF Standard 40 (revised July 1990) that the Model F-54291-5 manufactured by Aquarobic International, has fulfilled the requirements of Standard 40 for Class I plant. Aquarobic Model F-54291-5 has therefore been authorized to bear the NSF Mark so long as they continue to meet the requirements of Standard 40 and NSF General and Program Specific Policies.

General performance evaluation and stress tests were performed at the Wastewater Technology Site of NSF *International*, located in Chelsea, Michigan. The raw waste utilized in the test was comminuted municipal waste. The characteristics of the waste are included in the tabulated data of this report.

The observations and analyses included in this report are certified to be correct and true copies of the data secured during the performance tests conducted by NSF on the wastewater treatment plants described herein. The manufacturer has agreed to present the data in this certification in its entirety whenever it is used in advertising, prospectuses, bids or similar uses.

Thomas Stevens
Manager
Wastewater Certification Program

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Appendix B - Standard 40 Performance Evaluation Protocol and Requirements

Appendix C - Analytical Results

1.0 PROCESS DESCRIPTION

The Aquarobic International Model F-54291-5 wastewater treatment plant utilizes an extended aeration activated sludge process to achieve treatment. In the activated sludge process, microorganisms remove soluble contaminants from the wastewater, utilizing them as a source of energy for growth and production of new microorganisms. The organisms tend to be flocculent and form clumps, or floc, that physically entrap particulate organic matter. The organic matter are attacked by extracellular enzymes that solubilize the solids to make them available to the microorganisms as a food source. The conversion of the organic matter from soluble to biological solids allows for removal of the organic matter by settling of the solids in the treatment process.¹

Extended aeration is a modification of the activated sludge process in which the microorganisms are allowed to remain in the treatment process for long periods of time. The large amount of biological solids in the process provides a buffer for shock loading of organic matter. The long aeration period allows for the organisms in the system to consume itself, reducing the total amount of solids produced by the treatment process. This does not, however, eliminate the need for removal of solids from the system. Removal of solids is necessary to keep from exceeding the capacity of the solids separation process utilized before discharge of the treated wastewater from the process.

The organisms primarily responsible for the degradation of the organic matter are aerobic bacteria. As such, the transfer of oxygen into the wastewater by an aeration system is a critical component of the treatment process. The aeration system also provides for the mixing of the wastewater and organisms to provide contact between the organic contaminants in the wastewater and the organisms that provide for removal of the contaminants. For this reason, an activated sludge process is referred to as a suspended growth system. Interruption of the aeration system for a long period of time can have a serious impact on the process.

2.0 PERFORMANCE EVALUATION

2.1 Description of Plant Evaluated

The Aquarobic plant tested has a rated capacity of 500 gallons per day (gpd). Plant specifications and drawings are included in Appendix A.

The tested unit operates on a fill-and-draw batch treatment process (sequencing batch reactor) and uses fine bubbled diffused air for the aerobic biological treatment. Wastewater entering the plant is accumulated and treated for a period of 20 hours during which time it is aerated continuously. The aeration is shut off at 2 a.m. and is followed by a three hour period of quiescent settling (2 a.m. to 5 a.m.). After the settling period, the supernatant is pumped out of the plant (5 a.m. - 6 a.m.). The settled solids are retained in the tank for continued aerobic digestion.

2.2 Test Protocol

The NSF Standard 40 Performance Evaluation method and requirements are included in Appendix B. Start up of the plant is accomplished by filling one-third of the volume with raw wastewater and the remainder of the volume with fresh water. The plant is then dosed at the design loading rate (500 gpd) three weeks. Doses were made during three dosing periods:

- 6 a.m. to 9 a.m. - 35 percent of daily rated capacity
- 11 a.m. to 2 p.m. - 25 percent of daily rated capacity
- 5 p.m. to 8 p.m. - 40 percent of daily rated capacity

After a three week start up period, the plant is subjected to the following loading sequence:

- Design loading - 16 weeks
- Stress loading - 7 weeks
- Design loading - 3 weeks

During the design loading periods, 24-hour composite samples are collected of the influent and effluent five times per week. The samples are analyzed for BOD₅, suspended solids and volatile suspended solids. On-site determinations of the effluent temperature, pH and dissolved oxygen are also made five times per week. In plant measurements of aeration chamber temperature, pH, dissolved oxygen and aeration chamber suspended solids are also made five times per week.

Stress testing is designed to evaluate how the plant performs under non-ideal conditions, including high and low hydraulic loadings and electrical or system failure. The test sequence includes (1) Wash Day stress, (2) Working Parent stress, (3) Power Failure stress, and (4) Vacation stress. Detailed descriptions of the stress sequences are shown in Appendix B.

During the stress test sequence, 24 hour composite samples are collected before and for seven days after each stress dosing pattern. The analyses and on-site determinations completed on the samples are the same as described for the design load testing. Additional samples are collected during the Wash Day and Working Parent stresses for informational purposes only and are not included in the pass/fail calculations. These samples include two samples collected during the Wash Day stress, two during the Working Parent stress, one samples collected immediately after the power is renewed to the plant during the Power Failure stress and one collected with the start of dosing in the Vacation stress.

In order for the plant to achieve Class I effluent, it is required to produce an effluent which meets the EPA guidelines for secondary effluent discharge²:

BOD₅ and Suspended Solids: (a) the arithmetic mean of all effluent samples collected in a period of 30 consecutive sample days must be ≤ 30 mg/L, with ≥ 85 percent removal; and (b) the arithmetic mean of all effluent samples collected in a 7 consecutive sample day period must be ≤ 45 mg/L.

pH: Effluent values remain between 6.0 and 9.0.

Requirements are also specified for effluent color, odor, oily film and foam, as well as maximum noise levels allowed from the plant. In determining if the plant meets the effluent requirements, ten percent of the samples during the testing, not to exceed one sample during stress testing, may be excluded from the pass/fail determination. A minimum of 118 sample days, 23 during the stress test sequence, must be collected and analyzed for the test to be valid.

2.3 Test Chronology

The plant was installed for testing under the direction of the manufacturer on December 15, 1992, and dosing, at the rate of 500 gpd, was started on March 22, 1993. After three weeks of start-up, sampling was started on April 12, 1993. The stress test sequence was started on August 2, 1993 and ended on September 22, 1993. The evaluation was completed on October 25, 1993, although samples were collected through October 29, 1993. A failure of a relay to the discharge pump occurred on July 1, and was replaced by NSF personnel. No other mechanical problems occurred during the test.

3.0 ANALYTICAL RESULTS

3.1 Summary

Chemical analysis of samples collected during the evaluation were completed using the procedures in *Standard Methods for the Examination of Water and Wastewater*³, or U.S. Environmental Protection Agency procedures⁴. Copies of the data generated during the evaluation are included in Appendix C. The results of the chemical analyses and on-site observations and measurements made during the evaluation are summarized in Table I.

Guidelines for evaluating the analytical results from the testing are described in Section 5.1 and Section H of Appendix A in NSF Standard 40. In completing the pass/fail determination on the data generated from the testing, ten percent (a total of twelve) of the samples collected during testing (not to exceed one sample during stress testing) can be excluded from the pass/fail calculations. No sample days were excluded from the pass/fail determinations.

Section 2.9 and Section E of Appendix A of the Standard define influent wastewater characteristics as it applies to testing under the Standard. Typical domestic wastewater is defined as having a BOD₅ concentration between 100 and 300 mg/L and a suspended solids concentration between 100 and 350 mg/L. By the Program Specific Policies for *Wastewater Treatment Devices and Related Products and Components* (dated January 1, 1991):

When the influent Biochemical Oxygen Demand and/or Suspended Solids fall outside the ranges specified in Section 2.9 of Standard 40, the effluent samples for the two calendar days immediately following the occurrence may be excluded in the 7 and 30 sample averages.

The Policy does not require exclusion of data following a day with influent concentrations outside the defined ranges, but allows for discard should the influent strength have an apparent impact on plant performance. There were fifteen sample days when the influent strength fell outside the specified range, but none were determined to have an impact on plant performance.

TABLE I. SUMMARY OF ANALYTICAL RESULTS

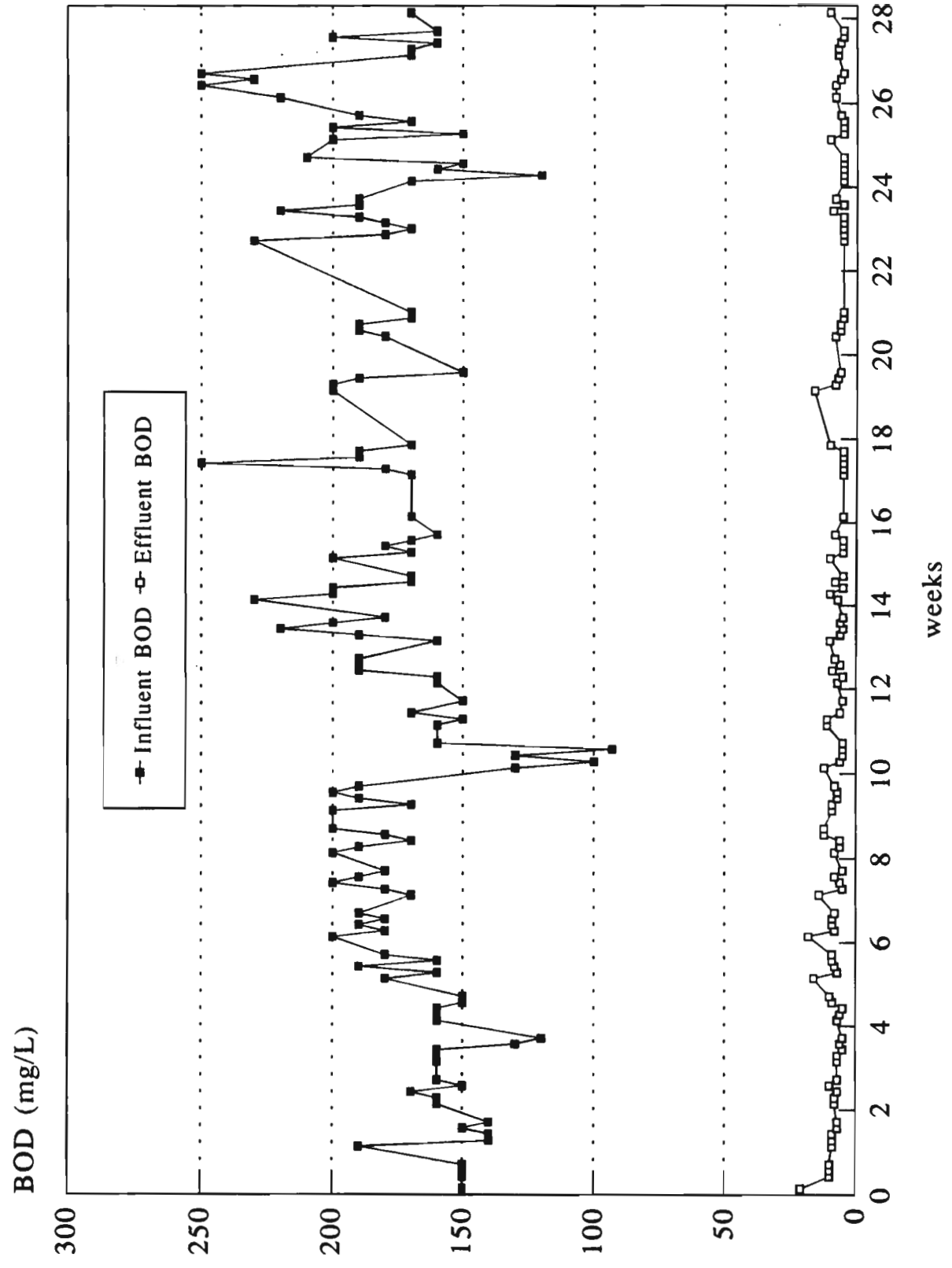
	<u>Average</u>	<u>Std.Dev.</u>	<u>Minimum</u>	<u>Maximum</u>	<u>Median</u>	<u>Interquartile Range</u>
BOD₅ (mg/L)						
<i>Influent</i>	176	27	93	250	170	160-190
<i>Effluent</i>	7	3	<5	21	7	5-8
Suspended Solids (mg/L)						
<i>Influent</i>	213	53	130	400	200	170-230
<i>Aeration Chamber</i>	3,900	1,830	410	7,600	3,600	2,500-4,800
<i>Effluent</i>	14	11	<5	83	11	8-13
Volatile Suspended Solids (mg/L)						
<i>Influent</i>	176	42	110	330	160	140-190
<i>Aeration Chamber</i>	2,620	1,180	310	5,000	2,500	1,700-3,100
<i>Effluent</i>	11	8	<5	55	9	6-11
pH						
<i>Influent</i>	-	-	7.3	7.6	7.5	7.4-7.5
<i>Aeration Chamber</i>	-	-	7.4	7.9	7.6	7.5-7.6
<i>Effluent</i>	-	-	7.5	8.9	7.8	7.8-7.9
Temperature (°C)						
<i>Influent</i>	17.4	2.7	12	21	18	15-19
<i>Aeration Chamber</i>	17.6	3.1	10	22	18	16-20
<i>Effluent</i>	13.9	4.7	3	22	14	10-18
Dissolved Oxygen (mg/L)						
<i>Aeration Chamber</i>	8.0	0.8	5.7	10.2	7.9	7.5-8.2
<i>Effluent</i>	7.1	0.7	5.2	9.0	7.2	6.5-7.7

Notes: The median is the point where half of the values are greater and half are less.
The interquartile range is the range of values about the median between the upper and lower 25 percent of all values.

3.2 Biochemical oxygen demand

The carbonaceous five day biochemical oxygen demand (BOD₅) analyses were completed using the EPA Method 405.1. The results of the analyses completed on the samples collected during the testing, except those collected for informational purposes, are shown in Figure 1.

Figure 1. Biochemical Oxygen Demand



Influent BOD₅:

The influent BOD₅ ranged from 93 to 250 mg/L during the evaluation, with an average concentration of 176 mg/L and a median concentration of 170 mg/L.

Effluent BOD₅:

The effluent BOD₅ concentrations ranged from less than 5 to 21 mg/L over the course of the evaluation, with an average concentration of 7 mg/L.

Standard 40 requires that over the course of the evaluation, the effluent BOD₅ not exceed 45 mg/L on a 7-day average and 30 mg/L on a 30-day average, and represent a reduction of not less than 85 percent of the 30-day average influent. The averages refer to seven and thirty consecutive sample averages, and not consecutive days. A plot of the 7 and 30-day average concentrations and 30-day average percent removals, is shown in Figure 2.

The 7-day average for effluent BOD₅ ranged from 5 to 11 mg/L, the 30-day average for effluent BOD₅ ranged from 6 to 9 mg/L, and the percent removal ranged from 94 to 97 percent. As shown in Figure 2, the Aquarobic Model F-54291-5 plant met the requirements of Standard 40 for effluent BOD₅.

3.3 Suspended solids

Suspended solids (SS) and volatile suspended solids (VSS) analyses were completed using Methods 209C and 209D of *Standard Methods*. The results of the SS analyses over the entire evaluation are shown in Figure 3. The data from both analyses are summarized in Table I.

Influent suspended solids:

The influent suspended solids concentration ranged from 130 to 400 mg/L during the evaluation, with an average concentration of 213 mg/L. The median influent suspended solids over the course of the evaluation was 200 mg/L. The influent volatile suspended solids concentrations ranged from 110 to 330 mg/L during the evaluation, with an average concentration of 176 mg/L and a median concentration of 160 mg/L.

Aeration chamber suspended solids:

The aeration chamber suspended solids ranged from 410 to 7,600 mg/L during the evaluation, with an average concentration of 3,900 mg/L. The aeration chamber VSS ranged from 310 to 5,000 mg/L, with an average concentration of 2,620 mg/L. The median values for the aeration chamber were 3,600 mg/L suspended solids and 2,500 mg/L volatile suspended solids.

Figure 2. Effluent BOD Averages and Percent BOD Removal

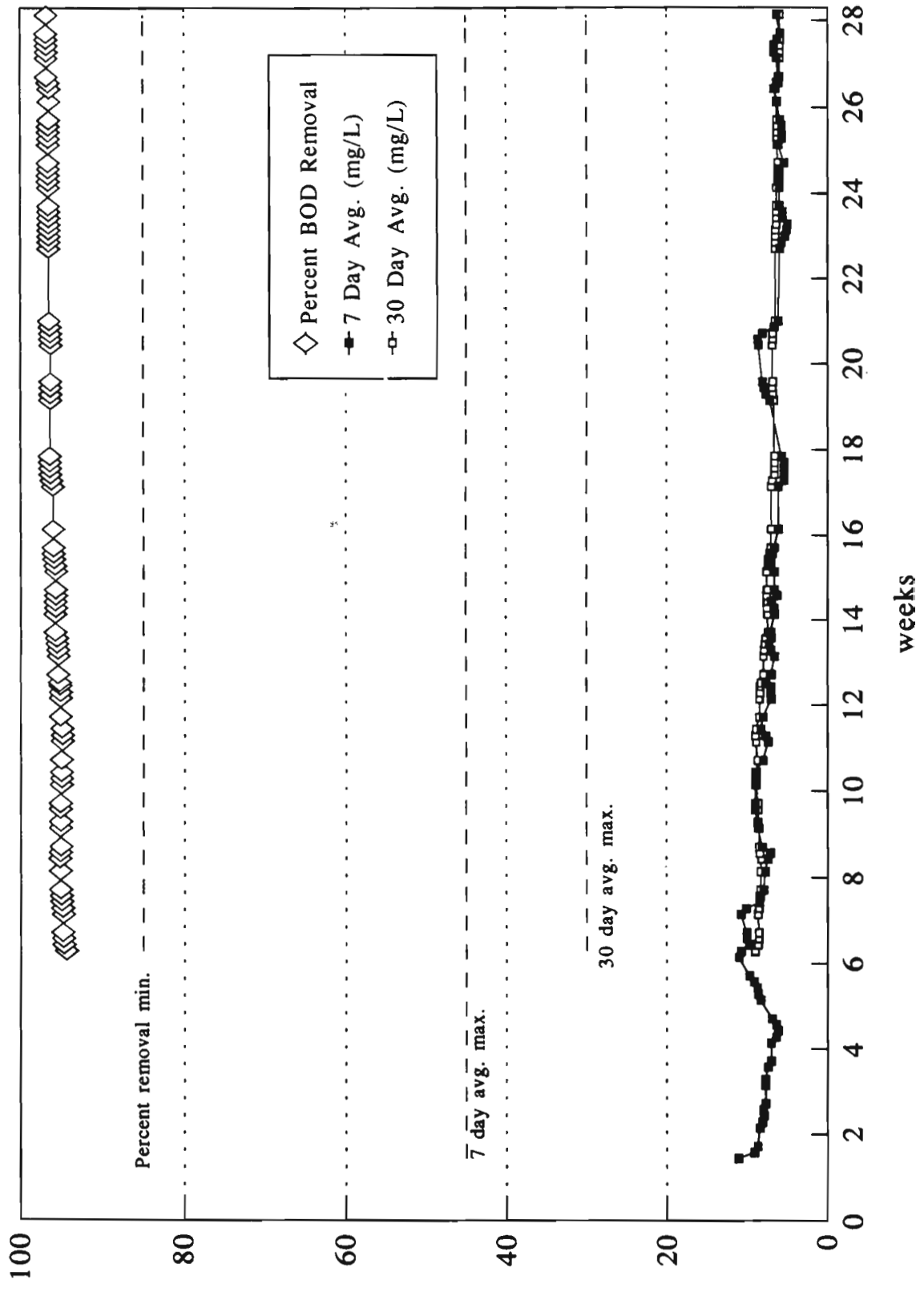
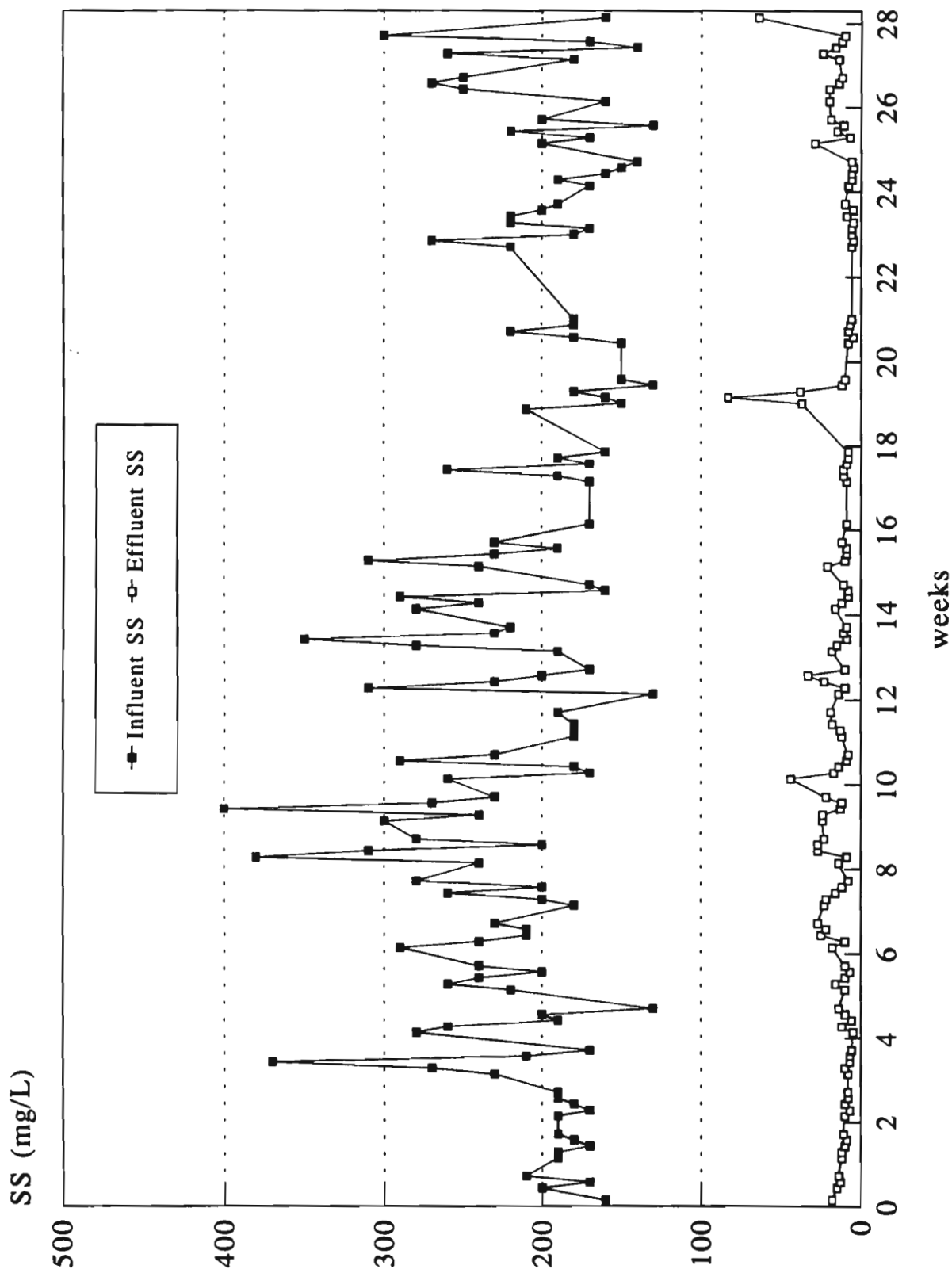


Figure 3. Suspended Solids



Effluent suspended solids:

The effluent suspended solids concentrations ranged from less than 5 to 83 mg/L during the evaluation, with an average concentration of 14 mg/L.

Over the course of the evaluation, NSF Standard 40 requires that, for Class I listing, the effluent suspended solids not exceed 45 mg/L on a 7-day average, 30 mg/L on a 30-day average and that the plant achieve not less than 85 percent reduction of the 30-day average influent suspended solids concentration. A plot of the 7- and 30-day averages, as well as the percent removal, is shown in Figure 4.

The 7-day average suspended solids ranged from 6 to 25 mg/L, the 30-day averages ranged from 10 to 19 mg/L and the percent reduction ranged from 91 to 95 percent. As shown in Figure 4, the Aquarobic Model F-54291-5 plant met the requirements of NSF Standard 40 for effluent suspended solids.

3.4 pH

Over the entire evaluation period, the influent pH ranged from 7.3 to 7.6 (median of 7.5), while the aeration chamber pH ranged from 7.4 to 7.9 (median of 7.6). The effluent pH ranged from 7.5 to 8.9 (median of 7.8) during the evaluation, within the 6 to 9 range required by NSF Standard 40. The pH data for the evaluation are shown in Appendix C.

3.5 Temperature

Influent temperatures over the evaluation period ranged from 12 to 21°C (median of 18°C) while aeration chamber temperatures ranged between 10 and 22°C (median of 18°C). Effluent temperatures ranged between 3 and 22° C (median of 14°C). The temperature data are shown in Appendix C.

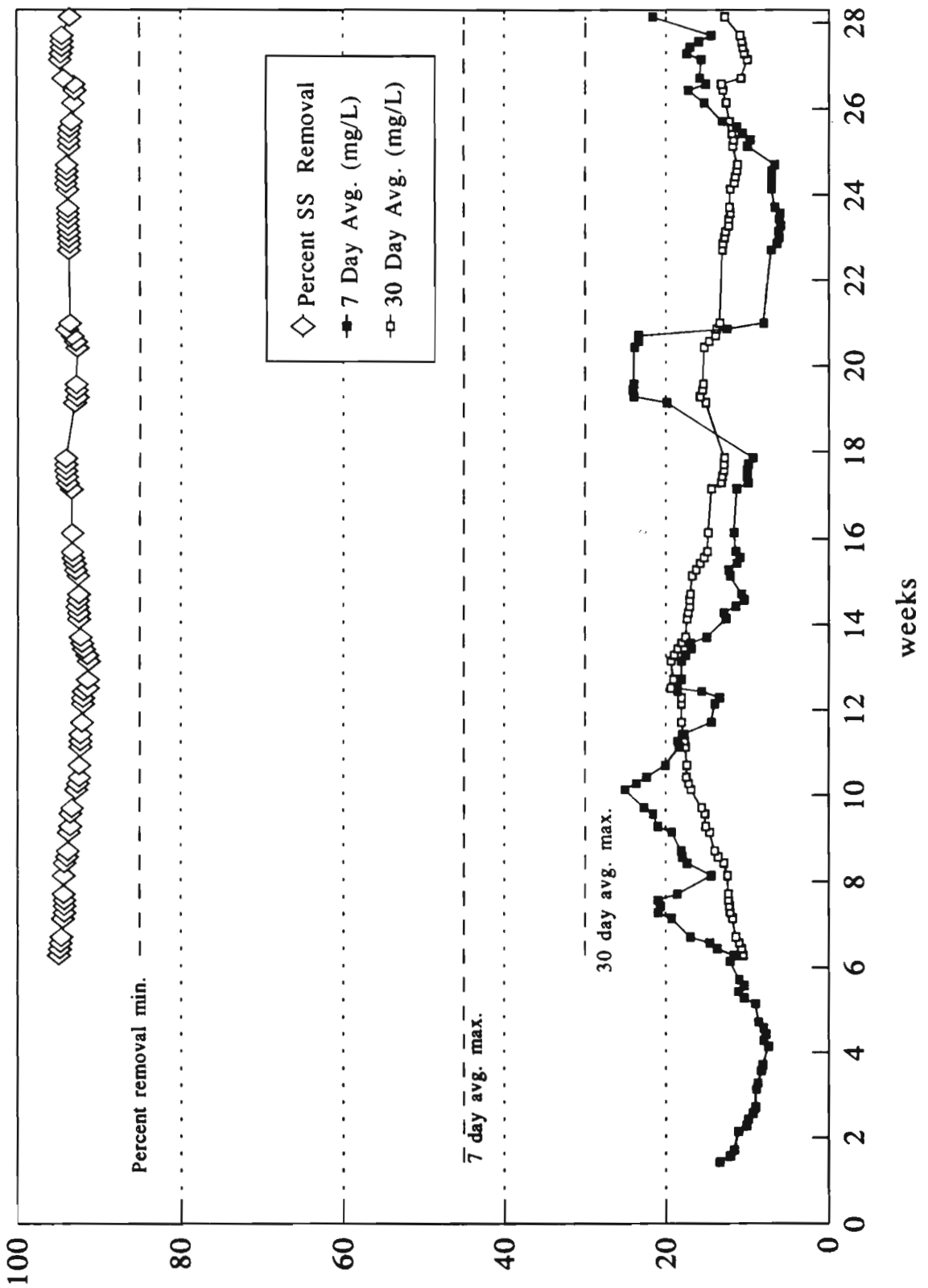
3.6 Dissolved oxygen

Dissolved oxygen (DO) was measured in the aeration chamber and effluent during the evaluation. The aeration chamber DO ranged between 5.7 and 10.2 mg/L (median of 7.9 mg/L), while the effluent DO ranged from 5.2 to 9.0 mg/L (median of 7.2 mg/L). All dissolved oxygen data are shown in Appendix C.

3.7 Color, threshold odor, oily film, foam

Three samples of the effluent were analyzed for color, odor, oily film and foam as prescribed in NSF Standard 40. The effluent was acceptable according to the requirements in NSF Standard 40, with color less than 15 units, non-offensive threshold odor, no visible evidence of oily film and no foam.

Figure 4. Effluent SS Averages and Percent SS Removal



3.8 Noise

A reading of the noise level at a distance of 20 feet from the plant was taken while the plant was in operation, using a hand-held decibel meter. The reading was below the 60 dbA required under NSF Standard 40.

4.0 REFERENCES

1. Grady, Jr., C.P., and H.C. Lim, Biological Wastewater Treatment: Theory and Applications, Marcel Dekker Publishers, New York, 1980.
2. "Environmental Protection Agency Guidelines for Secondary Treatment", Federal Register, Volume 28, No. 159, 1973.
3. APHA, AWWA, WPCF, Standard Methods for the Examination of Water and Wastewater, 17th Edition, American Public Health Association, Washington, D.C..
4. U.S. EPA, Methods for Chemical Analysis of Water and Wastes, U.S. Environmental Protection Agency, Washington, D.C..

APPENDIX A
PLANT SPECIFICATIONS

Compressor
Series
Model
Manufacturer

Discharge Pur
Speed
Horsepower
Series
Model
Manufacturer

Floats
Speed
Horsepower
Series
Model
Manufacturer

Alarm
Warning
Model
Manufacturer

PLANT SPECIFICATIONS

AQUAROBIC MODEL F-54291-5

Hydraulic Capacity:	500 gallons per day
Volumetric Capacity:	1,500 gallons
BOD ₅ Loading:	5 pounds per day
Electrical Requirements:	115/230 V AC, 60 Hz, 20 amps

DESIGN COMPONENTS AND MATERIALS

Wastewater Tank

Material	Fiberglass
----------	------------

Controller

Manufacturer	Aquarobic International, Inc.
Model	CP54291-5
Series	4/3 amps, 115/230 V, 1 Phase

Compressor

Manufacturer	Fuji Electric
Model	VFC 304P-5T
Series	5.0/2.5 amps, 115/230 V, 1 Phase
Horsepower	1/2 HP
Speed	3600 rpm

Discharge Pump

Manufacturer	Gould Pumps, Inc.
Model	LDN 0712
Series	6.2/5.2 amps, 115/230 V, 1 Phase
Horsepower	3/4 HP
Speed	3500 rpm

Floats

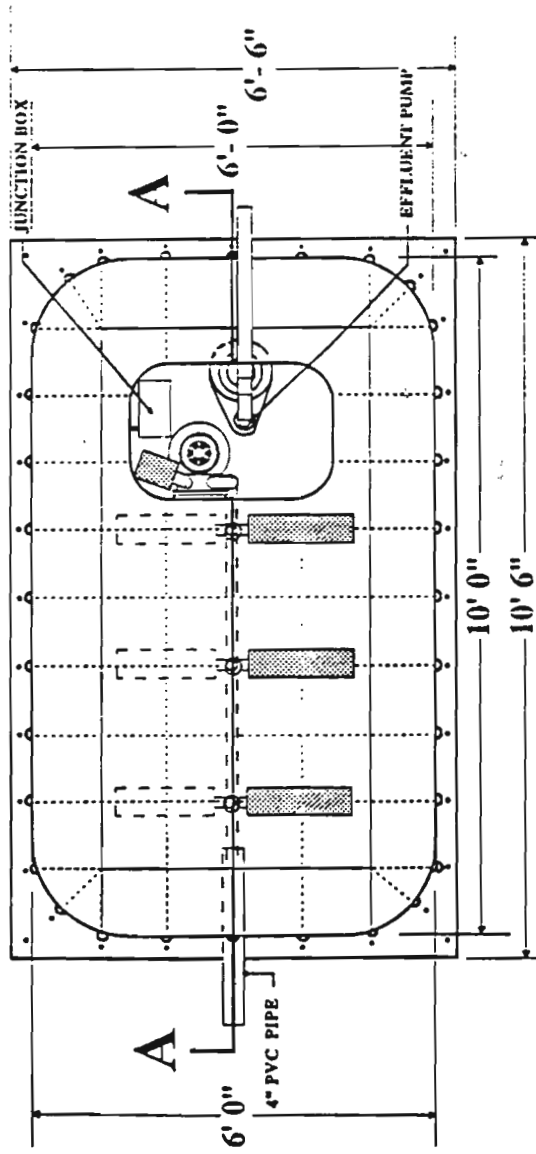
Manufacturer	S.J. Electro
Models	10JSDWOP (3), 10JSUWOP (1)

Alarm

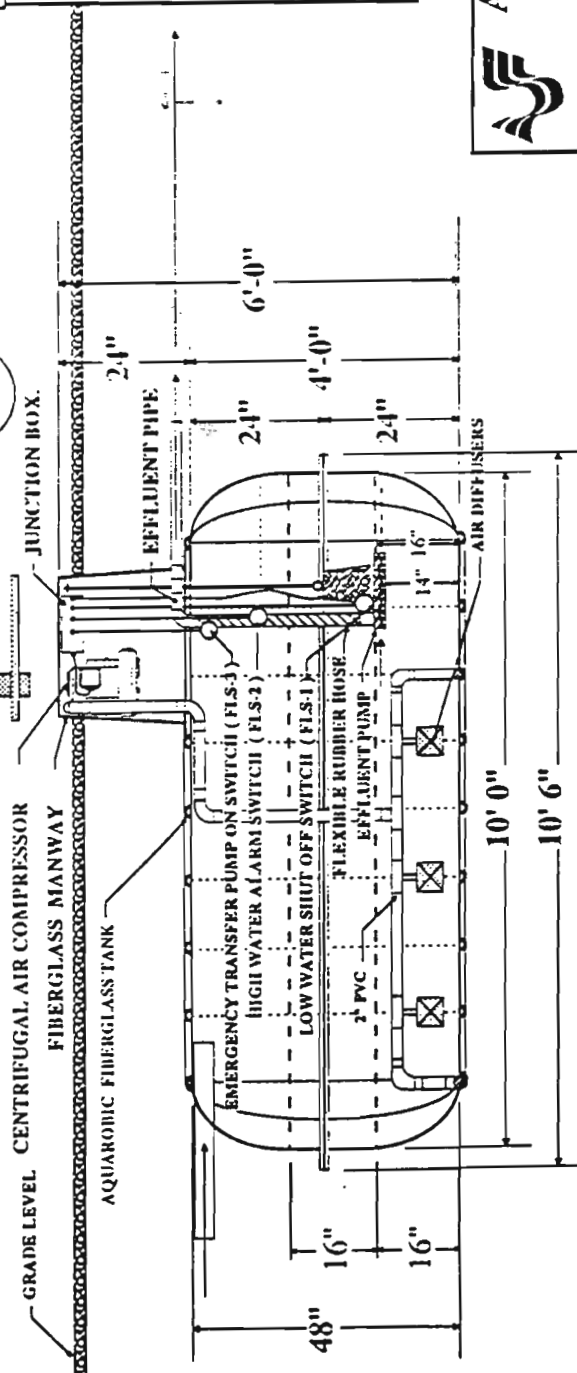
Manufacturer	Edwards
Model	123A-N5
Warning	Audible & Visible at control panel

MINI-PLANT MODELS # F54291-5[®]

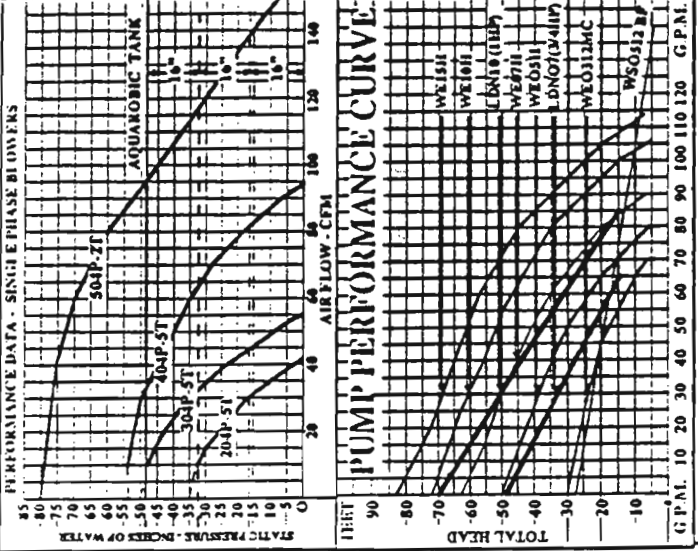
TANK SIZE = THREE TIMES THE DAILY WASTEWATER FLOW



MINI-PLANT' PLAN VIEW



MINI-PLANT SECTION A-A



N.S.F. INT. CLASS #1

**REMOVAL EFFICIENCIES
BASED ON AVERAGE OF VALUES
11 APRIL 1993 -- 28 OCTOBER 1993**

	INFLUENT MEDIAN	EFFLUENT MEDIAN	REDUCTION	PERCENT REDUCTION
BIOCHEMICAL OXYGEN DEMAND MG/L	170	7	163	95.8%
SUSPENDED SOLIDS MG/L	200	11	189	94.5%

AQUAROBIC
INTERNATIONAL, INC.
999 SHENANDOAH SHORES RD.
FRONT ROYAL, VIRGINIA U.S.A. 22630
PHONE: (703) 635-5200 / FAX: (703) 635-2277
SCALE: 1/8" = 1'-0"

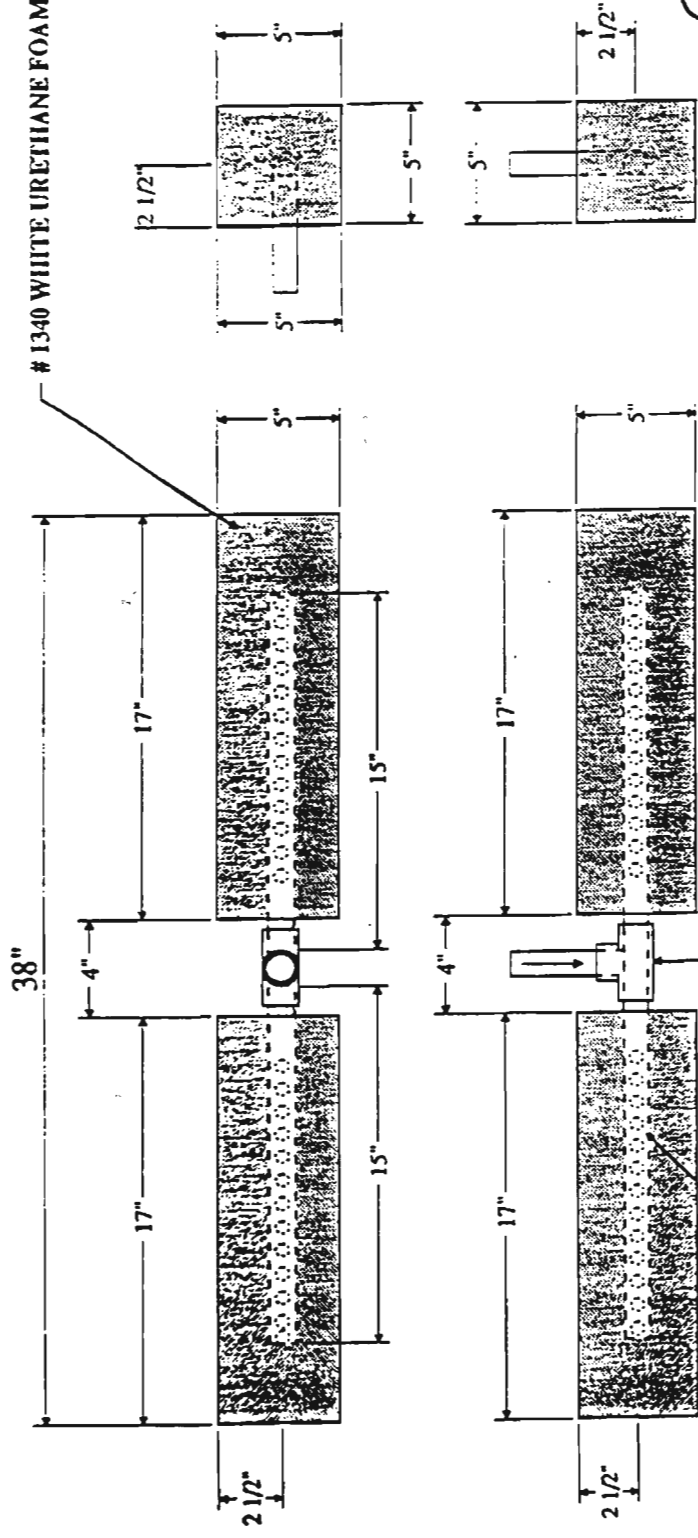
500 GPD. FIBERGLASS TANK MINI-PLANT

BY: D.E.P.

DRAWING NO: 81993.F.54291.5.210 DATE: 12/9/1993

NOTES:
1. THE CONCEPT DESIGN DISCLOSED IS PROPRIETARY WITH AQUAROBIC INTERNATIONAL INC AND MAY NOT BE REPRODUCED OR USED WITHOUT PRIOR WRITTEN AUTHORIZATION.

1340 WHITE URETHANE FOAM



PVC. PIPE
SCHEDULE 40

PVC. TEE
SCHEDULE 40

© AQUAROBIC INT. 1993



AQUAROBIC
INTERNATIONAL INC.
999A SHENANDOAH SHORES RD.
FRONT ROYAL, VIRGINIA 22630
PHONE: (703) 635-3300 / FAX: (703) 635-3377

AQUAROBIC INT. AIR DIFFUSER

SCALE: 3" = 1" MODEL# DFCR-101 BY: D.E.P.
DRAWING # 5393-DFCR DATE: 5/3/1993

NOTES:

1. THE CONCEPT HEREIN DISCLOSED IS PROPRIETARY WITH AQUAROBIC INTERNATIONAL INC. AND MAY NOT BE REPRODUCED OR USED WITHOUT PRIOR WRITTEN AUTHORIZATION.

APPENDIX B

**NSF STANDARD 40 PERFORMANCE EVALUATION
METHOD AND REQUIREMENTS**

...revised edition of Standard
...published by the American Public Health

All samples
...
...

13

...identical," some of the parameters that should be considered are
...function.

...1015 Fifteenth St., N.W., Washington, DC 20005.

TEST METHOD

A. PURPOSE

The purpose of this test method is to verify that a plant complies with the applicable class effluent requirements during a six-month period.

Performance evaluation of the plant shall be independent of design and construction. However, structural weaknesses or defects and failures of process support equipment, shall be reported in the test results.

B. PREQUALIFICATIONS

1. **APPLICATION:** The application for performance evaluation of a particular model or model series shall include a basic description, design data, drawings, and parts and materials specifications for the plant and all equipment and appurtenances. A complete installation, operation, and maintenance manual, including a thorough discussion of process fundamentals, shall accompany the application.
2. **MODEL SERIES:** For a series of plants of the same model, varying in rated treatment capacities between 1514 and 5678 L (400 and 1500 gallons) per day, results achieved by the smallest plant in the series shall be indicative of the capabilities of all other plants in the series. The design and configurations of larger capacity plants shall be proportionally identical to the plant tested.¹

C. TESTING SEASON

The test can be carried out at any time of the year. If the test is conducted during cold weather, the plant and equipment shall be protected from freezing. If the test is conducted during warm weather, the temperature of the aeration compartment contents shall not exceed 30°C (86°F).

D. ANALYTICAL METHODS

All sample collection and analytical methods shall be those in the seventeenth edition of Standard Methods for the Examination of Water and Wastewater, published by the American Public Health Association², except as otherwise specified.

¹When defining "proportionally identical," some of the parameters that should be considered are hydraulics, dimensions, mixing, and filtration.

²American Public Health Association, 1015 Fifteenth St., N.W., Washington, DC 20005.

E. INFLUENT WASTEWATER CHARACTERISTICS

The influent wastewater characteristics shall be equivalent to wastewater generated from a normal household complying with the following typical domestic wastewater parameters:

BOD ₅	100-300 mg/L
SS	100-350 mg/L

F. LOADING REQUIREMENTS

1. **DESIGN LOADING:** The plant shall be hydraulically loaded at its rated daily capacity³ according to the following pattern of flow:

6 a.m. - 9 a.m.	35% of total daily flow
11 a.m. - 2 p.m.	25% of total daily flow
5 p.m. - 8 p.m.	40% of total daily flow

2. **STRESS TESTING⁴:** The plant shall be hydraulically loaded as indicated in the applicable figure in the following sequence:

- Wash Day (Figure A1),
- Working parents (Figure A2),
- Equipment or Power Failure (electrical equipment off) (Figure A3),
- One week vacation followed by shock loading. Typical of a family's return from vacation (Figure A4).

³Rated daily capacity is the designed treatment of the plant. Note the example below:

Effect of Testing at Design Loading

Assume average family = 5 persons

and average water use = 189 L/person/day (50 gals/person/day); then daily household waste = 946 Lpd (250 gpd).

Therefore, testing at rated daily capacity provides greater loading to plant than average family might be expected to contribute.

If minimum plant size = 1892 Lpd (500 gpd), then design loading simulates: Use by 10 persons @ 189 L/person/day (50 gals/person/day); or use by 5 persons @ 378 L/person/day (100 gals/person/day), or equal.

⁴Basis for 60% loading used to simulate working parents, equipment/power failure, and return from vacation:

Assume 5-person occupancy and 1892 Lpd (500 gpd) design capacity for aerobic system; Then

2 flushes/person @ 95 L/flush (25 gals) = 189 L (50 gals)

1 shower/person @ 76 L/shower (20 gals) = 379 L (100 gals)

3 loads washing @ 132 L/load (35 gals) = 379 L (105 gals)

Food preparation and dishes (est.) = 114 L (30 gals)

1079 L (285 gals)

= 60% Design Flow (approximately)

G. TEST METHOD

1. GENERAL:

- a. Should mechanical malfunctions at the test facility occur during testing (dosing interruption, communitor failure, sampler malfunction, etc.) the testing agency shall determine the potential adverse affect on the performance of the system and determine what analytical values shall be included in the thirty- and seven-sample averages.
- b. The plant shall be installed, operated, and maintained according to the manufacturer's instructions during the test period. If these instructions conflict with provisions in this Appendix, the provisions in this Appendix shall be used.
- c. If the plant under test is installed at a higher grade than a typical field installation, the manufacturer may insulate the plant if normal treatment temperatures could be affected.

2. START-UP PROCEDURES:

- a. The plant shall be assembled according to the manufacturer's instructions. Equipment shall be checked by the manufacturer to determine that it is structurally sound. All defects shall be reported. If no defects are detected, that fact shall be indicated by the testing agency.
- b. If no defects are detected and the plant is judged to be structurally sound, it shall be filled to capacity with one-third wastewater and two-thirds water⁵.
- c. The wastewater loading pattern provided in Section F.1 (normal loading) shall begin. Sampling and testing shall begin within three weeks after the plant is filled and placed into operation, and continue without interruption until the end of the test, with the following exception:

The testing agency shall make repairs for unexpected mechanical malfunctions that are explained in the manufacturer's operation manual. Routine service and maintenance of the plant will not be allowed during the test period.

- d. **LOADING SEQUENCE:** The plant shall be subjected to the following loading sequence:

Design loading (Section F.1) - 16 weeks
Stress sequence (Section F.2) - 7 weeks
Design loading (Section F.1) - 3 weeks

⁵Start-up of plant with two-thirds water and one-third wastewater is not intended to dictate actual field start-up procedures.

The plant shall be returned to design loading for seven days between each stressing sequence.

3. **SAMPLING:**

a. **GENERAL:**

- The daily composite sample shall consist of flow-proportional samples collected at least once per hour during periods of influent flow.

b. **DESIGN LOADING:**

- The evaluation analyses as specified in Appendix A, Table 1 shall be followed.
- All samples shall be collected and analyzed on a five-days-per-week basis.

c. **STRESS TESTING:**

- Samples collected immediately following each stressing shall include 24-hour composites of influent and effluent and analyzed in accordance with Appendix A, Table 1.
- Samples shall be collected immediately before the beginning of each sequence and each 24 hours for 7 days following each stress sequence.

NOTE: Two samples shall be collected during the working period and wash day stresses and analyzed for BOD₅, SS, and pH. The data shall not be used in determining acceptance.

TABLE 1
GENERAL TEST SAMPLING

<u>Sample Location</u>	<u>Sample Type</u>	<u>Test Frequency</u>	<u>DO</u> <u>mg/L</u>	<u>BOD₅</u> <u>mg/L</u>	<u>Suspended Solids (SS),</u> <u>mg/L</u>	<u>Volatile Suspended Solids (VSS),</u> <u>Percent</u>	<u>Settleable Solids</u> <u>in mL/L</u> <u>45 min.</u>	<u>Temp</u> <u>°C</u>	<u>pH</u>
Raw Influent	24 hr. Composite*	Monday - thru Friday		X	X	X		X ¹	X ¹
Final Effluent	24 hr. Composite*	Monday - thru Friday	X ¹	X	X	X		X ¹	X ¹
Aeration Chamber	Grab	Monday - thru Friday	X ¹		X	X	X	X ¹	X ¹

*See Item 3.a.

¹ In situ measurement.

H. ACCEPTANCE

1. The plant shall meet the applicable performance requirements of Section 5 of this standard.
2. To evaluate the pass/fail criteria set forth in Section 5 of this Standard a minimum of 118 sample days (23 during stressing) shall be collected and analyzed.
3. Due to the biological process, it is understood that aerobic systems may have days of upset. Therefore, for both Class I and Class II plants, 10% of the samples during testing (not to exceed one sample during stress testing) will not be included in the pass/fail determination.

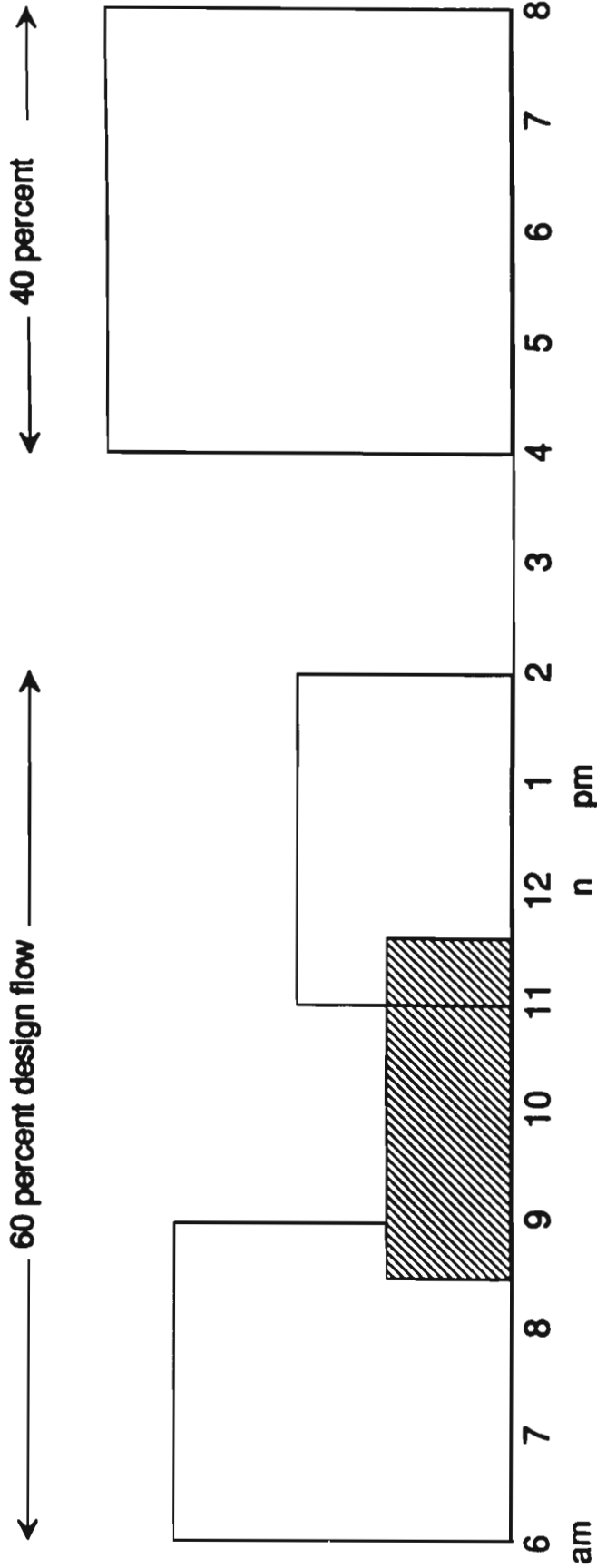
I. REPORTS

- The testing agency shall provide a report to the manufacturer that includes significant data showing test results for the plant tested in accordance with this standard. Appropriate comments shall be provided. All data shall be included in the report, along with the rationale for exclusion of any data due to adverse conditions during testing.

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WASH DAY LOADING

Added to plants 3 times in one 5-day week with one 24-hour period between each loading



Wash cycle contains low sudsing commercially available household detergent and household bleach at manufacturer's recommended use level

FIGURE A.2

WORKING PARENTS

No loading 9 am to 5 pm for 5 consecutive days

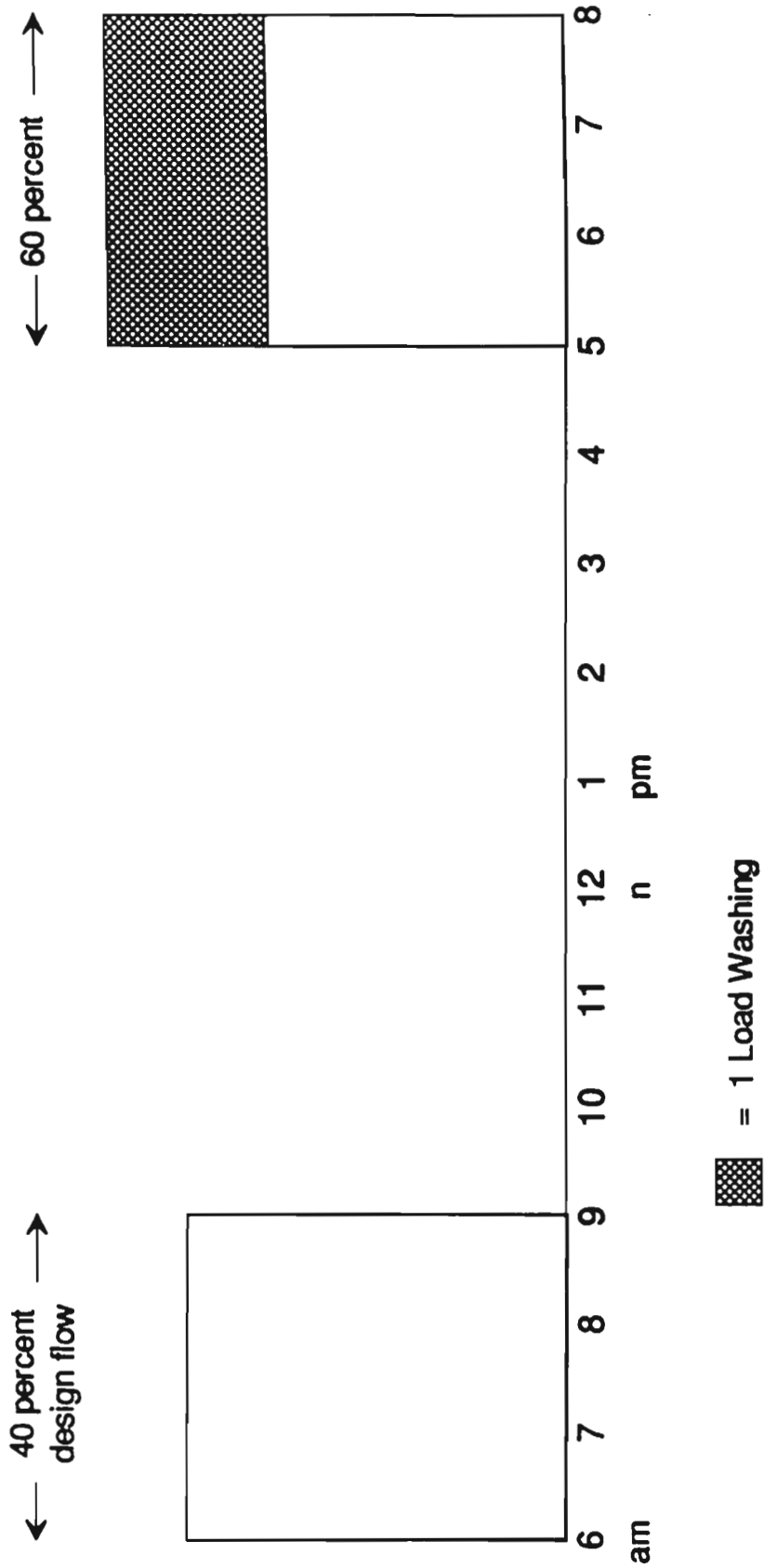


FIGURE A.3

EQUIPMENT OR POWER FAILURE All power to plant off for 48 hours, 1 time only

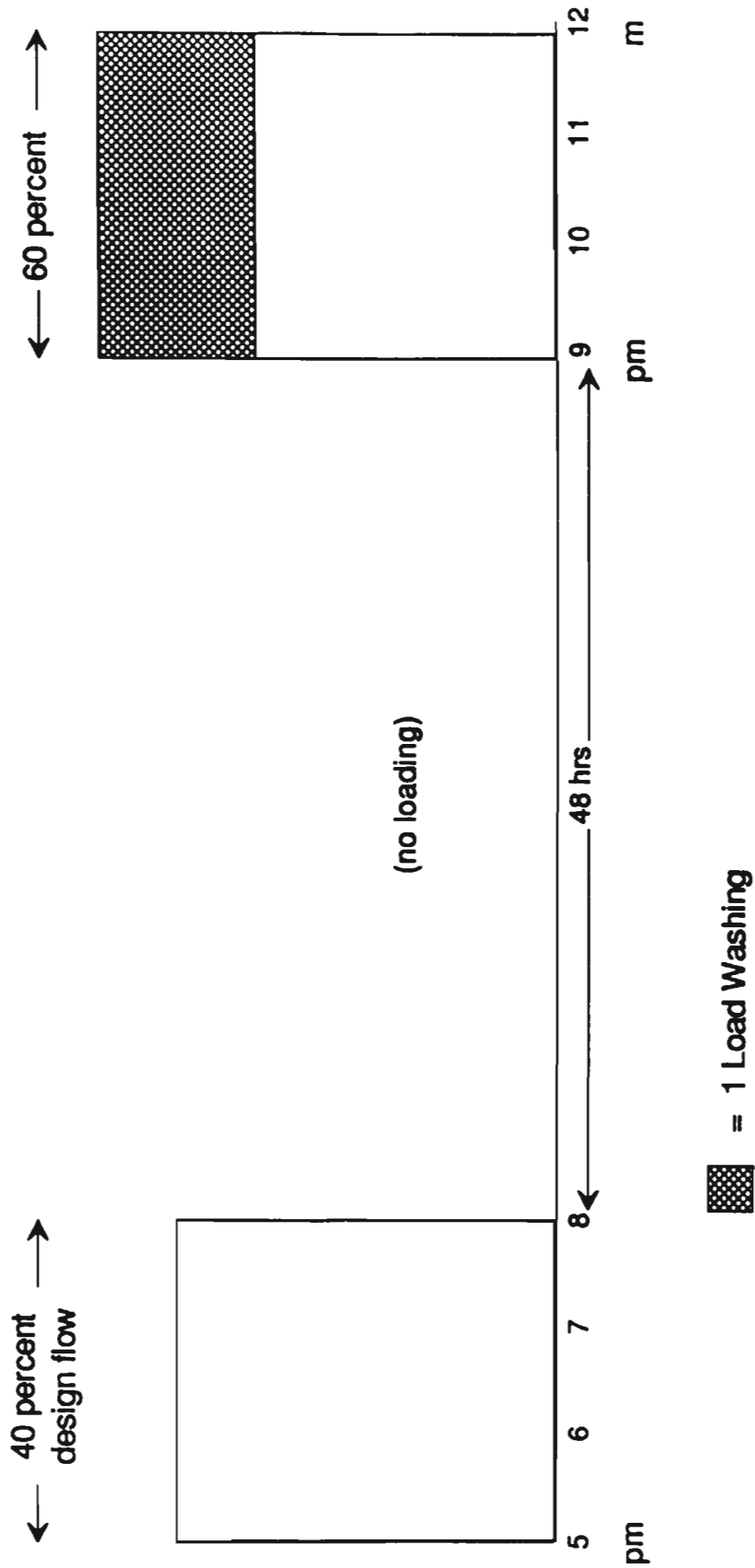
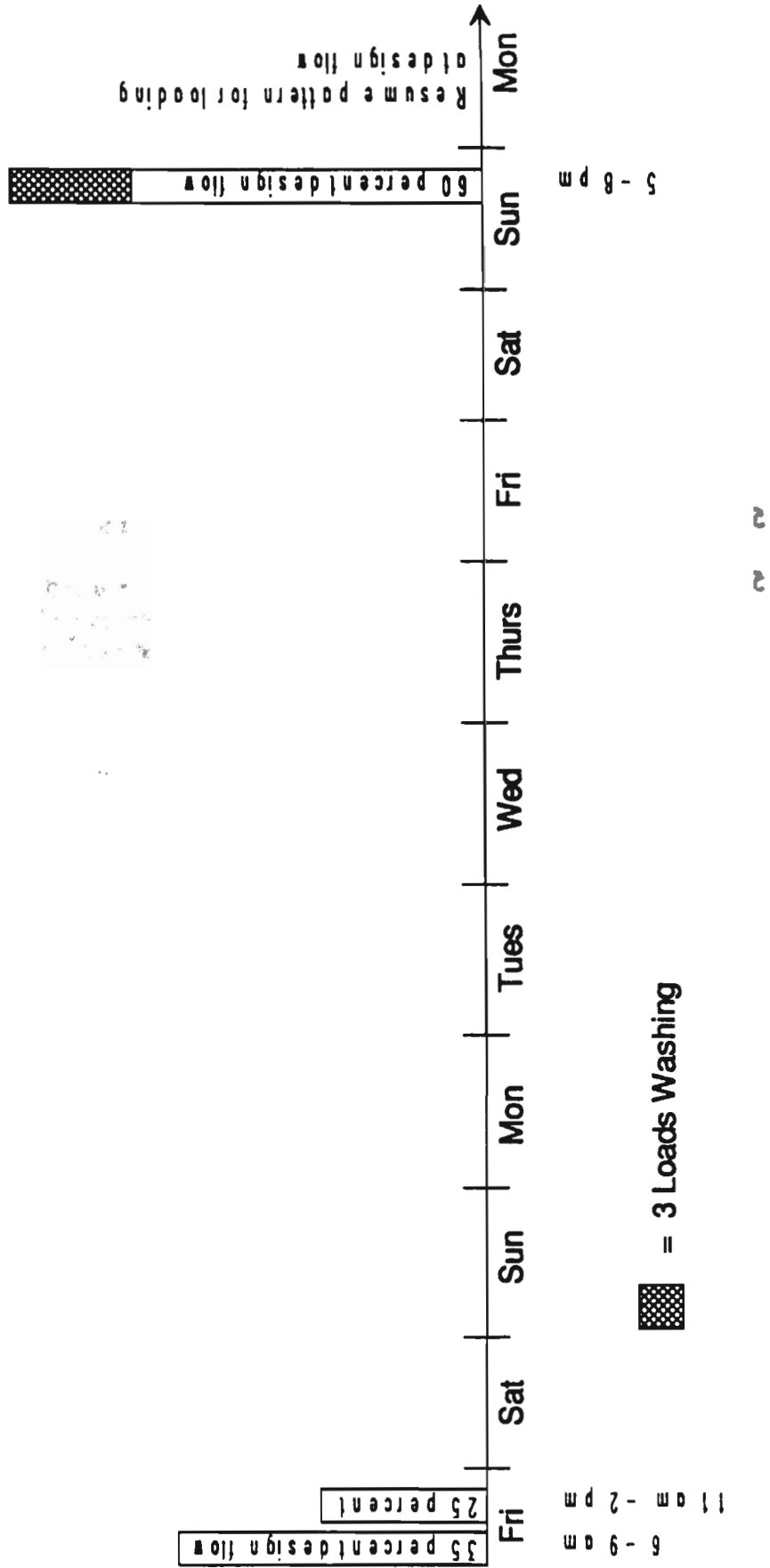


FIGURE A.4

ONE WEEK VACATION

No loading over 9-day period but all power on sudden shock when family returns home



PERFORMANCE REQUIREMENT⁵

5.0 **EFFLUENT QUALITY:** Plants shall be classified according to the effluent quality results obtained under the loading and operating conditions in Appendix A.

5.1 **CLASS I EFFLUENT:** Plants providing a Class I effluent shall be shown to meet EPA Secondary Treatment Guidelines⁶ for BOD₅, SS, and pH. These are as follows:

5.1.1 BOD₅ and SS

- Arithmetic mean of all effluent samples collected in a period of 30 consecutive⁷ days shall be ≤ 30 mg/L and ≥ 85 percent removal.
- Arithmetic mean of all effluent samples collected in a period of 7 consecutive days shall be ≤ 45 mg/L.
- Individual effluent samples shall not exceed a BOD₅ of 60 mg/L and SS of 100 mg/L.

5.1.2 pH - Effluent values shall remain between 6.0 and 9.0.

5.1.3 Effluent shall be tested three times during the six-month evaluation period for color, odor, oily film, and foam. The effluent shall be diluted 1:1000 with distilled water. Plants tested for Class I effluent characteristics shall not exceed:

- Color - 15 units;
- Threshold Odor - nonoffensive;
- Oily Film - nonvisible evidence other than air bubbles;
- Foam - none.

5.2 **CLASS II EFFLUENT:** Plants providing a Class II effluent shall be shown to meet an effluent quality level for BOD₅ of 60 mg/L and for SS of 100 mg/L. These maximum values shall not be exceeded more than 10 percent of the time.

⁴Underwriters Laboratories, Inc., 333 Pfingsten Rd., Northbrook, IL 60062.

National Electrical Manufacturer's Association, 2101 L St., N.W., Suite 300, Washington, DC 20037.

⁵The performance limits set forth in Section 5 take into account limitations of the respective analytical techniques relative to precision and accuracy. The limits shall be rigidly applied in the evaluation of test data in lieu of statistical interpretation.

⁶Federal Register, Vol 49, September 20, 1987, Title 40 Protection of Environment, Chapter 1 - EPA, Subchapter D - Water Programs, Part 133 Secondary Treatment Information, Item 133.102 Secondary Treatment.

⁷For Standard 40 applications, consecutive days shall be interpreted as consecutive sampling days.

- 5.3 **STRESS REQUIREMENTS:** Measured values for BOD₅ and SS of effluent composite samples collected beginning 24 hours after completion of each stressing condition (48 hours after the power outage stress), as described in Appendix A, shall not exceed the applicable class effluent requirements in Item 5.1 and 5.2.
- 5.4 **NOISE:** Mechanical component parts shall be installed or protected so the noise produced does not exceed 60 dbA when measured 6.0 m (20 feet) from the plant or appurtenances.
- 5.5 **MODIFICATION OF TEST METHODS:** The manufacturer shall follow the procedures in Appendix C to request a modification of a specific test method. A request for a modification of a test method may be needed due to the following:
- The design of the plant precludes effective testing in accordance with the Standard.
 - The manufacturer submits a design change to a previously tested plant that may not require full performance testing.

APPENDIX C
ANALYTICAL RESULTS

Sample No.	Analysis	Result
1023-01	Other	
1023-02	Other	
1023-03	Other	
1023-04	Other	
1023-05	Other	
1023-06	Other	
1023-07	Other	
1023-08	Other	
1023-09	Other	
1023-10	Other	
1023-11	Other	
1023-12	Other	
1023-13	Other	
1023-14	Other	
1023-15	Other	
1023-16	Other	
1023-17	Other	
1023-18	Other	
1023-19	Other	
1023-20	Other	

NSF International
Standard 40 - Individual Wastewater Treatment Plants

Week Beginning: April 11, 1993

Plant Code: 9/109

Weeks Into Test: 1

Weekend Dosing: Sunday - 500 gallons

Saturday - 500 gallons

		Monday	Tuesday	Wednesday	Thursday	Friday
Dosed Volume (gallons)		500	500	500	500	500
Dissolved Oxygen (mg/L)	aeration chamber	8.7	9.9	9.9	9.9	10.0
	effluent	(4)	(4)	(4)	(4)	(4)
Temperature (°C)	influent	12	12	12	12	12
	aeration chamber	10	11	11	11	11
	effluent	(4)	(4)	(4)	(4)	(4)
pH	influent	7.4	7.5	7.5	7.5	7.5
	aeration chamber	7.8	7.8	7.9	7.8	7.8
	effluent	7.9	(1)	7.9	7.9	7.9
Biochemical Oxygen Demand (mg/L)	influent	150	(1)	150	150	150
	effluent	21	(1)	10	10	10
Suspended Solids (mg/L)	influent	160	(1)	200	170	210
	aeration chamber	410	(1)	740	860	870
	effluent	18	(1)	15	13	14
Volatile Suspended Solids (mg/L)	influent	130	(1)	170	150	180
	aeration chamber	310	(1)	580	670	660
	effluent	13	(1)	12	11	10
45 Minute Settleable Solids (mL/L)	aeration chamber	40	56	58	60	63

- (1) Site problem
- (2) Malfunction of system under test
- (3) Weather problem
- (4) Other

Notes: No samples on 4/13 due to problem with sampler.

NSF International
Standard 40 - Individual Wastewater Treatment Plants

Week Beginning: April 18, 1993

Plant Code: 9/109

Weeks Into Test: 2

Weekend Dosing: Sunday - 500 gallons Saturday - 500 gallons

		Monday	Tuesday	Wednesday	Thursday	Friday
Dosed Volume (gallons)		500	500	500	500	500
Dissolved Oxygen (mg/L)	aeration chamber	9.9	10.2	10.2	10.1	9.8
	effluent	(4)	(4)	(4)	(4)	9.0
Temperature (°C)	influent	12	12	12	12	13
	aeration chamber	11	12	12	12	12
	effluent	(4)	(4)	(4)	(4)	9
pH	influent	7.4	7.5	7.5	7.5	7.4
	aeration chamber	7.8	7.8	7.7	7.8	7.8
	effluent	7.9	7.9	7.8	7.8	7.9
Biochemical Oxygen Demand (mg/L)	influent	190	140	140	150	140
	effluent	9	9	9	7	7
Suspended Solids (mg/L)	influent	190	190	170	180	190
	aeration chamber	850	1,000	980	960	1,100
	effluent	12	12	10	9	11
Volatile Suspended Solids (mg/L)	influent	160	160	140	160	160
	aeration chamber	620	760	720	750	890
	effluent	9	10	7	8	9
45 Minute Settleable Solids (mL/L)	aeration chamber	60	70	74	76	80

- (1) Site problem
- (2) Malfunction of system under test
- (3) Weather problem
- (4) Other

Notes:

NSF International
Standard 40 - Individual Wastewater Treatment Plants

Week Beginning: April 25, 1993

Plant Code: 9/109

Weeks Into Test: 3

Weekend Dosing: Sunday - 500 gallons Saturday - 500 gallons

		Monday	Tuesday	Wednesday	Thursday	Friday
Dosed Volume (gallons)		500	500	500	500	500
Dissolved Oxygen (mg/L)	<i>aeration chamber</i>	8.4	8.5	8.5	8.7	8.6
	<i>effluent</i>	8.4	8.4	8.4	8.0	8.0
Temperature (°C)	<i>influent</i>	13	13	13	13	13
	<i>aeration chamber</i>	12	12	13	13	13
	<i>effluent</i>	11	11	12	12	13
pH	<i>influent</i>	7.5	7.5	7.6	7.5	7.6
	<i>aeration chamber</i>	7.6	7.6	7.8	7.7	7.6
	<i>effluent</i>	8.0	7.9	8.1	7.9	7.9
Biochemical Oxygen Demand (mg/L)	<i>influent</i>	160	160	170	150	160
	<i>effluent</i>	8	8	7	10	7
Suspended Solids (mg/L)	<i>influent</i>	190	170	180	190	190
	<i>aeration chamber</i>	1,300	1,200	1,400	1,300	1,500
	<i>effluent</i>	10	7	10	8	8
Volatile Suspended Solids (mg/L)	<i>influent</i>	160	140	150	160	160
	<i>aeration chamber</i>	920	900	1,000	1,000	1,100
	<i>effluent</i>	7	6	8	6	6
45 Minute Settleable Solids (mL/L)	<i>aeration chamber</i>	90	100	100	110	125

- (1) Site problem
- (2) Malfunction of system under test
- (3) Weather problem
- (4) Other

Notes:

NSF International
Standard 40 - Individual Wastewater Treatment Plants

Week Beginning: May 2, 1993

Plant Code: 9/109

Weeks Into Test: 4

Weekend Dosing: Sunday - 500 gallons Saturday - 500 gallons

		Monday	Tuesday	Wednesday	Thursday	Friday
<i>Dosed Volume (gallons)</i>		500	500	500	500	500
<i>Dissolved Oxygen (mg/L)</i>	<i>aeration chamber</i>	8.4	8.5	8.4	8.5	9.4
	<i>effluent</i>	7.9	8.0	7.9	7.9	7.8
<i>Temperature (°C)</i>	<i>influent</i>	13	14	14	14	14
	<i>aeration chamber</i>	14	14	14	14	15
	<i>effluent</i>	10	9	8	8	10
<i>pH</i>	<i>influent</i>	7.4	7.4	7.5	7.4	7.4
	<i>aeration chamber</i>	7.6	7.6	7.7	7.6	7.6
	<i>effluent</i>	7.9	8.0	8.1	8.1	8.9
<i>Biochemical Oxygen Demand (mg/L)</i>	<i>influent</i>	160	160	160	130	120
	<i>effluent</i>	7	7	<5	6	5
<i>Suspended Solids (mg/L)</i>	<i>influent</i>	230	270	370	210	170
	<i>aeration chamber</i>	1,700	1,700	1,700	1,800	1,800
	<i>effluent</i>	8	10	7	7	6
<i>Volatile Suspended Solids (mg/L)</i>	<i>influent</i>	200	230	270	150	140
	<i>aeration chamber</i>	1,200	1,300	1,200	1,300	1,300
	<i>effluent</i>	7	9	5	5	6
<i>45 Minute Settleable Solids (mL/L)</i>	<i>aeration chamber</i>	130	150	150	150	160

- (1) Site problem
- (2) Malfunction of system under test
- (3) Weather problem
- (4) Other

Notes:

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Standard 40 - Individual Wastewater Treatment Plants

Week Beginning: May 9, 1993

Plant Code: 9/109

Weeks Into Test: 5

Weekend Dosing: Sunday - 500 gallons

Saturday - 500 gallons

		Monday	Tuesday	Wednesday	Thursday	Friday
Dosed Volume (gallons)		500	506	500	500	500
Dissolved Oxygen (mg/L)	aeration chamber	8.5	8.3	8.1	8.1	8.2
	effluent	8.0	7.8	7.8	7.9	7.7
Temperature (°C)	influent	14	15	15	15	15
	aeration chamber	15	15	16	14	16
	effluent	10	13	14	10	9
pH	influent	7.4	7.5	7.4	7.6	7.5
	aeration chamber	7.6	7.7	7.5	7.6	7.6
	effluent	7.9	8.0	7.9	8.1	8.0
Biochemical Oxygen Demand (mg/L)	influent	160	160	160	150	150
	effluent	7	6	<5	9	10
Suspended Solids (mg/L)	influent	280	260	190	200	130
	aeration chamber	1,900	2,100	2,000	2,000	2,100
	effluent	5	12	6	10	14
Volatile Suspended Solids (mg/L)	influent	230	220	160	170	110
	aeration chamber	1,400	1,600	1,500	1,500	1,500
	effluent	<5	10	6	9	12
45 Minute Settleable Solids (mL/L)	aeration chamber	175	180	200	220	220

- (1) Site problem
- (2) Malfunction of system under test
- (3) Weather problem
- (4) Other

Notes:

NSF International
Standard 40 - Individual Wastewater Treatment Plants

Week Beginning: May 16, 1993

Plant Code: 9/109

Weeks Into Test: 6

Weekend Dosing: Sunday - 506 gallons Saturday - 500 gallons

		Monday	Tuesday	Wednesday	Thursday	Friday
Dosed Volume (gallons)		500	500	500	500	500
Dissolved Oxygen (mg/L)	aeration chamber	8.2	8.0	8.0	8.2	8.0
	effluent	7.9	7.4	7.4	7.6	7.2
Temperature (°C)	influent	15	15	15	15	15
	aeration chamber	14	16	16	14	14
	effluent	3	9	8	6	10
pH	influent	7.6	7.4	7.5	7.5	7.6
	aeration chamber	7.6	7.5	7.4	7.4	7.5
	effluent	7.9	8.1	8.0	7.9	8.0
Biochemical Oxygen Demand (mg/L)	influent	180	160	190	160	180
	effluent	16	7	8	9	9
Suspended Solids (mg/L)	influent	220	260	240	200	240
	aeration chamber	2,400	2,200	2,400	3,200	2,300
	effluent	10	16	10	7	10
Volatile Suspended Solids (mg/L)	influent	190	220	210	170	210
	aeration chamber	1,700	1,600	1,700	1,600	1,700
	effluent	8	13	9	6	8
45 Minute Settleable Solids (mL/L)	aeration chamber	250	250	260	250	250

- (1) Site problem
- (2) Malfunction of system under test
- (3) Weather problem
- (4) Other

Notes:

NSF International
Standard 40 - Individual Wastewater Treatment Plants

Week Beginning: May 23, 1993

Plant Code: 9/109

Weeks Into Test: 7

Weekend Dosing: Sunday - 500 gallons

Saturday - 500 gallons

		Monday	Tuesday	Wednesday	Thursday	Friday
<i>Dosed Volume (gallons)</i>		500	506	500	500	500
<i>Dissolved Oxygen (mg/L)</i>	<i>aeration chamber</i>	8.0	7.8	7.6	7.9	7.7
	<i>effluent</i>	6.9	6.5	6.9	6.9	7.3
<i>Temperature (°C)</i>	<i>influent</i>	15	16	16	16	16
	<i>aeration chamber</i>	15	14	16	16	13
	<i>effluent</i>	11	14	9	11	5
<i>pH</i>	<i>influent</i>	7.6	7.5	7.5	7.6	7.5
	<i>aeration chamber</i>	7.4	7.6	7.4	7.4	7.5
	<i>effluent</i>	8.0	7.8	7.8	7.8	7.8
<i>Biochemical Oxygen Demand (mg/L)</i>	<i>influent</i>	200	180	190	180	190
	<i>effluent</i>	18	8	9	9	8
<i>Suspended Solids (mg/L)</i>	<i>influent</i>	290	240	210	210	230
	<i>aeration chamber</i>	2,600	2,600	1,500	2,300	2,800
	<i>effluent</i>	18	10	25	22	27
<i>Volatile Suspended Solids (mg/L)</i>	<i>influent</i>	240	200	180	180	190
	<i>aeration chamber</i>	1,900	1,900	750	1,600	2,000
	<i>effluent</i>	15	7	20	18	23
<i>45 Minute Settleable Solids (mL/L)</i>	<i>aeration chamber</i>	220	240	240	250	250

- (1) Site problem
- (2) Malfunction of system under test
- (3) Weather problem
- (4) Other

Notes:

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Standard 40 - Individual Wastewater Treatment Plants

Week Beginning: May 30, 1993

Plant Code: 9/109

Weeks Into Test: 8

Weekend Dosing: Sunday - 406 gallons Saturday - 500 gallons

		Monday	Tuesday	Wednesday	Thursday	Friday
<i>Dosed Volume (gallons)</i>		506	500	500	500	500
<i>Dissolved Oxygen (mg/L)</i>	<i>aeration chamber</i>	7.3	5.7	8.0	7.9	7.5
	<i>effluent</i>	7.0	8.2	7.7	7.9	6.5
<i>Temperature (°C)</i>	<i>influent</i>	16	15	16	16	16
	<i>aeration chamber</i>	16	16	16	16	14
	<i>effluent</i>	8	9	10	9	10
<i>pH</i>	<i>influent</i>	7.4	7.6	7.4	7.5	7.4
	<i>aeration chamber</i>	7.5	7.5	7.5	7.5	7.5
	<i>effluent</i>	7.8	8.0	7.8	7.8	7.7
<i>Biochemical Oxygen Demand (mg/L)</i>	<i>influent</i>	170	180	200	190	180
	<i>effluent</i>	14	5	6	8	<5
<i>Suspended Solids (mg/L)</i>	<i>influent</i>	180	200	260	200	280
	<i>aeration chamber</i>	2,600	3,200	2,800	2,500	3,400
	<i>effluent</i>	23	22	16	12	8
<i>Volatile Suspended Solids (mg/L)</i>	<i>influent</i>	150	140	190	170	240
	<i>aeration chamber</i>	1,800	1,900	1,700	1,800	2,500
	<i>effluent</i>	19	7	5	9	6
<i>45 Minute Settleable Solids (mL/L)</i>	<i>aeration chamber</i>	250	350	250	280	380

- (1) Site problem
- (2) Malfunction of system under test
- (3) Weather problem
- (4) Other

Notes: Low doses on 5/30 caused by problem with the float system.

NSF International
Standard 40 - Individual Wastewater Treatment Plants

Week Beginning: June 6, 1993

Plant Code: 9/109

Weeks Into Test: 9

Weekend Dosing: Sunday - 500 gallons

Saturday - 500 gallons

		Monday	Tuesday	Wednesday	Thursday	Friday
Dosed Volume (gallons)		500	500	500	500	500
Dissolved Oxygen (mg/L)	<i>aeration chamber</i>	7.5	7.4	7.3	7.4	7.2
	<i>effluent</i>	6.6	6.4	6.0	6.9	7.8
Temperature (°C)	<i>influent</i>	16	16	16	17	17
	<i>aeration chamber</i>	17	17	18	17	17
	<i>effluent</i>	12	13	15	16	12
pH	<i>influent</i>	7.4	7.5	7.4	7.5	7.5
	<i>aeration chamber</i>	7.5	7.5	7.4	7.5	7.6
	<i>effluent</i>	7.8	8.0	8.0	7.9	7.9
Biochemical Oxygen Demand (mg/L)	<i>influent</i>	200	190	170	180	200
	<i>effluent</i>	8	6	6	12	12
Suspended Solids (mg/L)	<i>influent</i>	240	380	310	200	280
	<i>aeration chamber</i>	3,600	3,200	3,400	3,000	2,800
	<i>effluent</i>	14	9	27	27	23
Volatile Suspended Solids (mg/L)	<i>influent</i>	210	270	240	160	230
	<i>aeration chamber</i>	2,600	2,300	2,500	2,100	1,900
	<i>effluent</i>	13	7	22	17	16
45 Minute Settleable Solids (mL/L)	<i>aeration chamber</i>	300	350	300	300	300

- (1) Site problem
- (2) Malfunction of system under test
- (3) Weather problem
- (4) Other

Notes:

NSF International
Standard 40 - Individual Wastewater Treatment Plants

Week Beginning: June 13, 1993

Plant Code: 9/109

Weeks Into Test: 10

Weekend Dosing: Sunday - 443 gallons

Saturday - 356 gallons

		Monday	Tuesday	Wednesday	Thursday	Friday
Dosed Volume (gallons)		500	500	406	450	369
Dissolved Oxygen (mg/L)	aeration chamber	6.7	7.8	8.2	7.9	7.0
	effluent	6.3	6.0	6.5	6.9	6.1
Temperature (°C)	influent	17	17	17	17	17
	aeration chamber	19	18	18	18	19
	effluent	13	19	15	16	18
pH	influent	7.5	7.4	7.4	7.5	7.6
	aeration chamber	7.5	7.6	7.5	7.5	7.4
	effluent	7.8	7.8	8.0	7.8	8.0
Biochemical Oxygen Demand (mg/L)	influent	200	170	190	200	190
	effluent	9	9	7	7	8
Suspended Solids (mg/L)	influent	300	240	400	270	230
	aeration chamber	2,900	3,000	3,300	3,300	3,800
	effluent	24	24	13	12	22
Volatile Suspended Solids (mg/L)	influent	240	200	330	230	200
	aeration chamber	2,000	2,100	2,200	2,300	2,600
	effluent	18	20	10	8	18
45 Minute Settleable Solids (mL/L)	aeration chamber	300	250	280	250	300

- (1) Site problem
- (2) Malfunction of system under test
- (3) Weather problem
- (4) Other

Notes: Low doses during the week caused by problem with the influent pump.

NSF International
Standard 40 - Individual Wastewater Treatment Plants

Week Beginning: June 20, 1993

Plant Code: 9/109

Weeks Into Test: 11

Weekend Dosing: Sunday - 500 gallons Saturday - 181 gallons

		Monday	Tuesday	Wednesday	Thursday	Friday
Dosed Volume (gallons)		500	500	500	500	500
Dissolved Oxygen (mg/L)	aeration chamber	7.1	7.3	7.5	7.6	7.7
	effluent	5.2	6.3	6.4	6.5	6.7
Temperature (°C)	influent	17	17	18	17	17
	aeration chamber	19	19	19	19	19
	effluent	17	15	16	17	17
pH	influent	7.4	7.5	7.4	7.5	7.5
	aeration chamber	7.5	7.6	7.5	7.5	7.5
	effluent	7.8	7.8	7.8	7.8	7.9
Biochemical Oxygen Demand (mg/L)	influent	130	100	130	93	160
	effluent	12	6	5	<5	5
Suspended Solids (mg/L)	influent	260	170	180	290	230
	aeration chamber	3,100	3,400	3,300	3,300	2,800
	effluent	44	17	14	9	8
Volatile Suspended Solids (mg/L)	influent	170	130	150	260	180
	aeration chamber	2,200	2,300	2,200	2,300	1,900
	effluent	37	13	11	7	6
45 Minute Settleable Solids (mL/L)	aeration chamber	260	230	250	280	260

- (1) Site problem
- (2) Malfunction of system under test
- (3) Weather problem
- (4) Other

Notes: Low doses on 6/26 caused by failure of influent pump.

NSF International
Standard 40 - Individual Wastewater Treatment Plants

Week Beginning: June 27, 1993

Plant Code: 9/109

Weeks Into Test: 12

Weekend Dosing: Sunday - 500 gallons Saturday - 500 gallons

		Monday	Tuesday	Wednesday	Thursday	Friday
<i>Dosed Volume (gallons)</i>		500	500	500	406	500
<i>Dissolved Oxygen (mg/L)</i>	<i>aeration chamber</i>	7.5	7.7	7.8	(4)	7.9
	<i>effluent</i>	6.6	9.0	7.3	(4)	7.7
<i>Temperature (°C)</i>	<i>influent</i>	18	18	18	(4)	18
	<i>aeration chamber</i>	19	17	18	(4)	19
	<i>effluent</i>	13	14	14	(4)	17
<i>pH</i>	<i>influent</i>	7.5	7.5	7.4	(4)	7.4
	<i>aeration chamber</i>	7.4	7.4	7.4	(4)	7.5
	<i>effluent</i>	7.7	7.8	7.9	(4)	7.9
<i>Biochemical Oxygen Demand (mg/L)</i>	<i>influent</i>	160	150	170	(4)	150
	<i>effluent</i>	11	11	6	(4)	5
<i>Suspended Solids (mg/L)</i>	<i>influent</i>	180	180	180	(4)	190
	<i>aeration chamber</i>	3,500	3,700	3,100	(4)	3,400
	<i>effluent</i>	12	13	18	(4)	19
<i>Volatile Suspended Solids (mg/L)</i>	<i>influent</i>	140	160	160	(4)	160
	<i>aeration chamber</i>	2,300	2,600	2,100	(4)	2,300
	<i>effluent</i>	10	12	15	(4)	16
<i>45 Minute Settleable Solids (mL/L)</i>	<i>aeration chamber</i>	300	280	300	(4)	300

(1) Site problem

Notes: Dosing temporarily shut off on 7/1 to check plant discharge.

(2) Malfunction of system under test

(3) Weather problem

(4) Other

NSF International
Standard 40 - Individual Wastewater Treatment Plants

Week Beginning: July 4, 1993

Plant Code: 9/109

Weeks Into Test: 13

Weekend Dosing: Sunday - 506 gallons

Saturday - 500 gallons

		Monday	Tuesday	Wednesday	Thursday	Friday
Dosed Volume (gallons)		500	500	500	500	500
Dissolved Oxygen (mg/L)	aeration chamber	7.5	7.5	7.4	7.5	7.5
	effluent	7.7	7.3	6.4	6.9	7.0
Temperature (°C)	influent	18	18	18	18	18
	aeration chamber	20	20	20	20	21
	effluent	19	20	20	22	19
pH	influent	7.4	7.5	7.5	7.5	7.5
	aeration chamber	7.4	7.6	7.7	7.6	7.6
	effluent	7.9	8.0	7.8	7.8	7.9
Biochemical Oxygen Demand (mg/L)	influent	160	160	190	190	190
	effluent	7	<5	9	6	8
Suspended Solids (mg/L)	influent	130	310	230	200	170
	aeration chamber	3,800	3,700	3,600	3,800	3,400
	effluent	14	10	23	33	10
Volatile Suspended Solids (mg/L)	influent	110	250	190	170	140
	aeration chamber	2,500	2,600	2,400	2,500	2,300
	effluent	10	9	17	23	8
45 Minute Settleable Solids (mL/L)	aeration chamber	250	300	300	320	300

- (1) Site problem
- (2) Malfunction of system under test
- (3) Weather problem
- (4) Other

Notes:

NSF International
Standard 40 - Individual Wastewater Treatment Plants

Week Beginning: July 11, 1993

Plant Code: 9/109

Weeks Into Test: 14

Weekend Dosing: Sunday - 500 gallons Saturday - 500 gallons

		Monday	Tuesday	Wednesday	Thursday	Friday
Dosed Volume (gallons)		500	500	500	500	500
Dissolved Oxygen (mg/L)	aeration chamber	7.6	7.5	7.5	7.5	7.5
	effluent	6.6	8.0	6.8	6.5	6.9
Temperature (°C)	influent	19	19	20	20	20
	aeration chamber	21	20	21	21	20
	effluent	19	19	19	20	17
pH	influent	7.5	7.4	7.4	7.5	7.5
	aeration chamber	7.5	7.5	7.6	7.6	7.6
	effluent	7.8	7.8	7.8	7.8	7.7
Biochemical Oxygen Demand (mg/L)	influent	160	190	220	200	180
	effluent	10	6	5	6	5
Suspended Solids (mg/L)	influent	190	280	350	230	220
	aeration chamber	4,200	4,300	3,600	3,500	3,300
	effluent	18	15	9	11	9
Volatile Suspended Solids (mg/L)	influent	160	230	290	190	180
	aeration chamber	2,700	2,900	2,300	2,400	2,200
	effluent	15	11	6	10	6
45 Minute Settleable Solids (mL/L)	aeration chamber	330	400	360	400	500

- (1) Site problem
- (2) Malfunction of system under test
- (3) Weather problem
- (4) Other

Notes:

NSF International
Standard 40 - Individual Wastewater Treatment Plants

Week Beginning: July 18, 1993

Plant Code: 9/109

Weeks Into Test: 15

Weekend Dosing: Sunday - 500 gallons Saturday - 500 gallons

		Monday	Tuesday	Wednesday	Thursday	Friday
<i>Dosed Volume (gallons)</i>		500	500	500	500	506
<i>Dissolved Oxygen (mg/L)</i>	<i>aeration chamber</i>	7.2	7.3	7.3	7.1	7.4
	<i>effluent</i>	6.4	6.5	6.5	6.7	7.9
<i>Temperature (°C)</i>	<i>influent</i>	20	20	20	20	19
	<i>aeration chamber</i>	21	21	19	19	20
	<i>effluent</i>	17	19	19	17	17
<i>pH</i>	<i>influent</i>	7.5	7.4	7.5	7.4	7.5
	<i>aeration chamber</i>	7.5	7.5	7.6	7.5	7.6
	<i>effluent</i>	7.8	7.8	7.8	7.8	7.9
<i>Biochemical Oxygen Demand (mg/L)</i>	<i>influent</i>	230	200	200	170	170
	<i>effluent</i>	7	10	<5	8	<5
<i>Suspended Solids (mg/L)</i>	<i>influent</i>	280	240	290	160	170
	<i>aeration chamber</i>	4,100	4,200	4,500	3,900	4,100
	<i>effluent</i>	16	12	8	8	11
<i>Volatile Suspended Solids (mg/L)</i>	<i>influent</i>	230	190	230	140	150
	<i>aeration chamber</i>	2,700	2,700	2,900	2,600	2,700
	<i>effluent</i>	13	10	6	7	8
<i>45 Minute Settleable Solids (mL/L)</i>	<i>aeration chamber</i>	380	350	380	300	300

- (1) Site problem
- (2) Malfunction of system under test
- (3) Weather problem
- (4) Other

Notes:

NSF International
Standard 40 - Individual Wastewater Treatment Plants

Week Beginning: July 25, 1993

Plant Code: 9/109

Weeks Into Test: 16

Weekend Dosing: Sunday - 500 gallons Saturday - 500 gallons

		Monday	Tuesday	Wednesday	Thursday	Friday
<i>Dosed Volume (gallons)</i>		500	500	500	500	500
<i>Dissolved Oxygen (mg/L)</i>	<i>aeration chamber</i>	7.1	7.8	7.7	7.0	7.5
	<i>effluent</i>	6.8	6.5	6.6	6.6	6.8
<i>Temperature (°C)</i>	<i>influent</i>	20	20	20	20	20
	<i>aeration chamber</i>	21	21	21	21	21
	<i>effluent</i>	19	19	19	19	15
<i>pH</i>	<i>influent</i>	7.4	7.4	7.5	7.4	7.5
	<i>aeration chamber</i>	7.5	7.4	7.5	7.4	7.4
	<i>effluent</i>	7.8	7.8	7.8	7.9	7.8
<i>Biochemical Oxygen Demand (mg/L)</i>	<i>influent</i>	200	170	180	170	160
	<i>effluent</i>	10	<5	5	<5	8
<i>Suspended Solids (mg/L)</i>	<i>influent</i>	240	310	230	190	230
	<i>aeration chamber</i>	3,600	4,200	4,500	4,000	4,400
	<i>effluent</i>	21	10	9	9	12
<i>Volatile Suspended Solids (mg/L)</i>	<i>influent</i>	190	260	200	160	190
	<i>aeration chamber</i>	2,400	2,800	3,100	2,700	3,000
	<i>effluent</i>	18	8	7	8	10
<i>45 Minute Settleable Solids (mL/L)</i>	<i>aeration chamber</i>	350	370	400	400	400

- (1) Site problem
- (2) Malfunction of system under test
- (3) Weather problem
- (4) Other

Notes:

NSF International
Standard 40 - Individual Wastewater Treatment Plants
Stress Test Evaluation

Week Beginning: August 1, 1993

Plant Code: 9/109

Weeks Into Test: 17

		Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
<i>Dosed Volume (gallons)</i>		275	450	450	450	450	450	500
<i>Dissolved Oxygen (mg/L)</i>	<i>aeration chamber</i>		7.5					
	<i>effluent</i>		6.6					
<i>Temperature (°C)</i>	<i>influent</i>		20					
	<i>aeration chamber</i>		21					
	<i>effluent</i>		19					
<i>pH</i>	<i>influent</i>		7.4	7.4		7.5		
	<i>aeration chamber</i>		7.5					
	<i>effluent</i>		7.8	7.8		7.9		
<i>Biochemical Oxygen Demand (mg/L)</i>	<i>influent</i>		170	180		180		
	<i>effluent</i>		<5	<5		6		
<i>Suspended Solids (mg/L)</i>	<i>influent</i>		170	200		200		
	<i>aeration chamber</i>		5,300					
	<i>effluent</i>		9	8		9		
<i>Volatile Suspended Solids (mg/L)</i>	<i>influent</i>		140	170		170		
	<i>aeration chamber</i>		3,500					
	<i>effluent</i>		7	8		7		
<i>45 Minute Settleable Solids (mL/L)</i>	<i>aeration chamber</i>		470					

- (1) Site problem
- (2) Malfunction of system under test
- (3) Weather problem
- (4) Other

Notes: Low doses on 8/1 caused by problem with float in dosing tank. Wash day stress started in 8/2.

NSF International
Standard 40 - Individual Wastewater Treatment Plants
Stress Test Evaluation

Week Beginning: August 8, 1993

Plant Code: 9/109

Weeks Into Test: 18

		Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
<i>Dosed Volume (gallons)</i>		500	500	500	500	500	606	463
<i>Dissolved Oxygen (mg/L)</i>	<i>aeration chamber</i>	7.0	7.5	7.6	7.6	7.8	7.5	
	<i>effluent</i>	5.5	7.0	7.0	7.1	6.9	7.2	
<i>Temperature (°C)</i>	<i>influent</i>	20	20	20	20	20	20	
	<i>aeration chamber</i>	20	20	20	20	21	21	
	<i>effluent</i>	20	15	16	14	20	20	
<i>pH</i>	<i>influent</i>	7.5	7.5	7.5	7.5	7.5	7.5	
	<i>aeration chamber</i>	7.5	7.7	7.5	7.6	7.5	7.6	
	<i>effluent</i>	7.7	7.8	7.8	7.9	7.9	7.7	
<i>Biochemical Oxygen Demand (mg/L)</i>	<i>influent</i>	190	170	180	250	190	190	
	<i>effluent</i>	7	<5	<5	5	<5	5	
<i>Suspended Solids (mg/L)</i>	<i>influent</i>	170	170	190	260	170	190	
	<i>aeration chamber</i>	4,500	4,800	5,400	4,100	5,000	4,400	
	<i>effluent</i>	21	9	11	11	9	8	
<i>Volatile Suspended Solids (mg/L)</i>	<i>influent</i>	140	140	150	210	150	160	
	<i>aeration chamber</i>	2,900	3,100	3,600	2,700	3,300	3,000	
	<i>effluent</i>	18	7	9	9	7	8	
<i>45 Minute Settleable Solids (mL/L)</i>	<i>aeration chamber</i>	400	320	390	300	350	350	

- (1) Site problem
- (2) Malfunction of system under test
- (3) Weather problem
- (4) Other

Notes: Over dose on 8/13 and low dose on 8/14 caused by problem with dosing panel timer.

NSF International
Standard 40 - Individual Wastewater Treatment Plants
Stress Test Evaluation

Week Beginning: August 15, 1993

Plant Code: 9/109

Weeks Into Test: 19

		Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
<i>Dosed Volume (gallons)</i>		200	463	463	438	500	500	500
<i>Dissolved Oxygen (mg/L)</i>	<i>aeration chamber</i>						8.1	8.0
	<i>effluent</i>						(1)	(1)
<i>Temperature (°C)</i>	<i>influent</i>						20	20
	<i>aeration chamber</i>						22	22
	<i>effluent</i>						(1)	(1)
<i>pH</i>	<i>influent</i>			7.5	7.5		7.5	7.5
	<i>aeration chamber</i>						7.5	7.4
	<i>effluent</i>			7.7	8.1		(1)	7.9
<i>Biochemical Oxygen Demand (mg/L)</i>	<i>influent</i>			170	210		170	(1)
	<i>effluent</i>			<5	<5		(1)	(1)
<i>Suspended Solids (mg/L)</i>	<i>influent</i>			180	260		180	210
	<i>aeration chamber</i>						4,800	5,200
	<i>effluent</i>			6	<5		(1)	(1)
<i>Volatile Suspended Solids (mg/L)</i>	<i>influent</i>			150	200		150	170
	<i>aeration chamber</i>						3,100	3,400
	<i>effluent</i>			<5	<5		(1)	(1)
<i>45 Minute Settleable Solids (mL/L)</i>	<i>aeration chamber</i>						400	400

- (1) Site problem
- (2) Malfunction of system under test
- (3) Weather problem
- (4) Other

Notes: No effluent samples on 8/20 and 8/21 due to problem with sampler.

NSF International
Standard 40 - Individual Wastewater Treatment Plants
Stress Test Evaluation

Week Beginning: August 22, 1993

Plant Code: 9/109

Weeks Into Test: 20

		Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Dosed Volume (gallons)		500	500	500	500	325	0	444
Dissolved Oxygen (mg/L)	aeration chamber	6.8	7.4	7.5	7.8	7.6		
	effluent	(1)	6.2	5.5	5.8	5.5		
Temperature (°C)	influent	20	20	20	21	20		
	aeration chamber	20	21	21	22	22		
	effluent	(1)	17	21	21	21		
pH	influent	7.5	7.6	7.5	7.5	7.5		
	aeration chamber	7.7	7.7	7.7	7.7	7.6		
	effluent	7.9	8.0	8.0	7.9	7.9		
Biochemical Oxygen Demand (mg/L)	influent	(1)	200	200	190	150		
	effluent	(1)	16	8	7	6		
Suspended Solids (mg/L)	influent	150	160	180	130	150		
	aeration chamber	4,700	5,100	4,800	5,900	5,300		
	effluent	37	83	38	12	10		
Volatile Suspended Solids (mg/L)	influent	130	140	160	110	130		
	aeration chamber	3,100	3,300	3,300	3,900	3,500		
	effluent	24	55	29	10	7		
45 Minute Settleable Solids (mL/L)	aeration chamber	425	450	400	400	480		

- (1) Site problem
- (2) Malfunction of system under test
- (3) Weather problem
- (4) Other

Notes: Power failure stress started on 8/26. No effluent sample on 8/22 due to problem with sampler.

NSF International
Standard 40 - Individual Wastewater Treatment Plants
Stress Test Evaluation

Week Beginning: August 29, 1993

Plant Code: 9/109

Weeks Into Test: 21

		Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
<i>Dosed Volume (gallons)</i>		500	500	500	500	500	500	500
<i>Dissolved Oxygen (mg/L)</i>	<i>aeration chamber</i>		7.8	7.5	7.5	7.9	7.6	8.6
	<i>effluent</i>		6.0	5.5	6.2	6.0	5.8	6.5
<i>Temperature (°C)</i>	<i>influent</i>	20	21	21	21	21	21	21
	<i>aeration chamber</i>		21	21	21	21	21	22
	<i>effluent</i>	22	17	21	17	18	19	21
<i>pH</i>	<i>influent</i>	7.4	7.4	7.5	7.4	7.4	7.5	7.4
	<i>aeration chamber</i>		7.8	7.7	7.7	7.7	7.7	7.7
	<i>effluent</i>	7.6	7.8	7.9	7.8	7.8	7.8	7.9
<i>Biochemical Oxygen Demand (mg/L)</i>	<i>influent</i>	190	200	180	180	190	190	170
	<i>effluent</i>	12	6	7	8	6	6	5
<i>Suspended Solids (mg/L)</i>	<i>influent</i>	190	210	220	150	180	220	180
	<i>aeration chamber</i>		5,300	5,900	4,900	6,000	5,500	5,100
	<i>effluent</i>	8	10	26	8	<5	8	7
<i>Volatile Suspended Solids (mg/L)</i>	<i>influent</i>	160	170	190	130	150	180	150
	<i>aeration chamber</i>		3,500	3,900	3,300	4,000	3,600	3,300
	<i>effluent</i>	6	7	24	7	<5	6	6
<i>45 Minute Settleable Solids (mL/L)</i>	<i>aeration chamber</i>		490	500	500	500	500	550

- (1) Site problem
- (2) Malfunction of system under test
- (3) Weather problem
- (4) Other

Notes:

NSF International
Standard 40 - Individual Wastewater Treatment Plants
Stress Test Evaluation

Week Beginning: September 5, 1993

Plant Code: 9/109

Weeks Into Test: 22

		Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
<i>Dosed Volume (gallons)</i>		125	0	0	0	0	0	0
<i>Dissolved Oxygen (mg/L)</i>	<i>aeration chamber</i>	9.8						
	<i>effluent</i>	7.8						
<i>Temperature (°C)</i>	<i>influent</i>	21						
	<i>aeration chamber</i>	22						
	<i>effluent</i>	22						
<i>pH</i>	<i>influent</i>	7.4						
	<i>aeration chamber</i>	7.7						
	<i>effluent</i>	7.8						
<i>Biochemical Oxygen Demand (mg/L)</i>	<i>influent</i>	170						
	<i>effluent</i>	5						
<i>Suspended Solids (mg/L)</i>	<i>influent</i>	180						
	<i>aeration chamber</i>	5,500						
	<i>effluent</i>	6						
<i>Volatile Suspended Solids (mg/L)</i>	<i>influent</i>	150						
	<i>aeration chamber</i>	3,600						
	<i>effluent</i>	<5						
<i>45 Minute Settleable Solids (mL/L)</i>	<i>aeration chamber</i>	550						

- (1) Site problem
- (2) Malfunction of system under test
- (3) Weather problem
- (4) Other

Notes: Vacation Stress started on 9/5.

NSF International
Standard 40 - Individual Wastewater Treatment Plants
Stress Test Evaluation

Week Beginning: September 12, 1993

Plant Code: 9/109

Weeks Into Test: 23

		Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
<i>Dosed Volume (gallons)</i>		0	0	375	500	500	500	500
<i>Dissolved Oxygen (mg/L)</i>	<i>aeration chamber</i>					8.6	8.2	8.2
	<i>effluent</i>					7.6	7.5	6.8
<i>Temperature (°C)</i>	<i>influent</i>					21	21	21
	<i>aeration chamber</i>					20	20	20
	<i>effluent</i>					13	15	19
<i>pH</i>	<i>influent</i>					7.5	7.5	7.5
	<i>aeration chamber</i>					7.7	7.7	7.6
	<i>effluent</i>					7.9	7.9	7.8
<i>Biochemical Oxygen Demand (mg/L)</i>	<i>influent</i>				180	180	230	180
	<i>effluent</i>				50	6	<5	<5
<i>Suspended Solids (mg/L)</i>	<i>influent</i>				190	230	220	270
	<i>aeration chamber</i>					5,000	4,400	5,200
	<i>effluent</i>				68	7	6	<5
<i>Volatile Suspended Solids (mg/L)</i>	<i>influent</i>				150	180	180	240
	<i>aeration chamber</i>					3,100	2,800	3,400
	<i>effluent</i>				44	6	<5	<5
<i>45 Minute Settleable Solids (mL/L)</i>	<i>aeration chamber</i>					450	550	550

- (1) Site problem
- (2) Malfunction of system under test
- (3) Weather problem
- (4) Other

Notes:

NSF International
Standard 40 - Individual Wastewater Treatment Plants
Stress Test Evaluation

Week Beginning: September 19, 1993

Plant Code: 9/109

Weeks Into Test: 24

		Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
<i>Dosed Volume (gallons)</i>		500	500	431	500	500	500	525
<i>Dissolved Oxygen (mg/L)</i>	<i>aeration chamber</i>	7.6	7.8	8.0	8.3	8.3	8.0	
	<i>effluent</i>	5.2	7.8	7.1	9.0	7.3	7.4	
<i>Temperature (°C)</i>	<i>influent</i>	20	20	20	20	20	20	
	<i>aeration chamber</i>	20	20	20	20	20	20	
	<i>effluent</i>	20	20	10	9	16	14	
<i>pH</i>	<i>influent</i>	7.4	7.3	7.5	7.4	7.5	7.5	
	<i>aeration chamber</i>	7.4	7.8	7.6	7.6	7.6	7.6	
	<i>effluent</i>	7.5	7.9	7.9	7.9	7.9	7.6	
<i>Biochemical Oxygen Demand (mg/L)</i>	<i>influent</i>	170	180	190	220	190	190	
	<i>effluent</i>	<5	5	<5	9	<5	8	
<i>Suspended Solids (mg/L)</i>	<i>influent</i>	180	170	220	220	200	190	
	<i>aeration chamber</i>	5,700	5,300	5,200	5,200	6,200	6,800	
	<i>effluent</i>	6	6	<5	9	<5	10	
<i>Volatile Suspended Solids (mg/L)</i>	<i>influent</i>	140	140	180	180	170	160	
	<i>aeration chamber</i>	4,500	3,400	3,300	3,400	4,100	4,400	
	<i>effluent</i>	<5	<5	<5	7	<5	9	
<i>45 Minute Settleable Solids (mL/L)</i>	<i>aeration chamber</i>	550	550	550	525	620	610	

- (1) Site problem
- (2) Malfunction of system under test
- (3) Weather problem
- (4) Other

Notes:

NSF International
Standard 40 - Individual Wastewater Treatment Plants

Week Beginning: September 26, 1993

Plant Code: 9/109

Weeks Into Test: 25

Weekend Dosing: Sunday - 525 gallons Saturday - 500 gallons

		Monday	Tuesday	Wednesday	Thursday	Friday
<i>Dosed Volume (gallons)</i>		500	500	500	500	500
<i>Dissolved Oxygen (mg/L)</i>	<i>aeration chamber</i>	7.7	8.3	8.3	8.2	8.3
	<i>effluent</i>	7.3	7.4	7.8	7.4	7.2
<i>Temperature (°C)</i>	<i>influent</i>	19	19	20	20	19
	<i>aeration chamber</i>	19	19	19	18	18
	<i>effluent</i>	12	9	12	8	11
<i>pH</i>	<i>influent</i>	7.6	7.4	7.5	7.5	7.5
	<i>aeration chamber</i>	7.7	7.6	7.6	7.5	7.6
	<i>effluent</i>	7.9	7.7	7.9	7.8	7.9
<i>Biochemical Oxygen Demand (mg/L)</i>	<i>influent</i>	170	120	160	150	210
	<i>effluent</i>	<5	<5	<5	<5	<5
<i>Suspended Solids (mg/L)</i>	<i>influent</i>	170	190	160	150	140
	<i>aeration chamber</i>	6,900	6,500	6,800	6,600	6,700
	<i>effluent</i>	8	6	6	<5	6
<i>Volatile Suspended Solids (mg/L)</i>	<i>influent</i>	140	150	130	140	120
	<i>aeration chamber</i>	4,700	4,300	4,600	4,300	4,400
	<i>effluent</i>	6	5	5	<5	<5
<i>45 Minute Settleable Solids (mL/L)</i>	<i>aeration chamber</i>	650	600	600	610	640

- (1) Site problem
- (2) Malfunction of system under test
- (3) Weather problem
- (4) Other

Notes:

NSF International
Standard 40 - Individual Wastewater Treatment Plants

Week Beginning: October 3, 1993

Plant Code: 9/109

Weeks Into Test: 26

Weekend Dosing: Sunday - 500 gallons Saturday - 500 gallons

		Monday	Tuesday	Wednesday	Thursday	Friday
<i>Dosed Volume (gallons)</i>		500	500	500	500	500
<i>Dissolved Oxygen (mg/L)</i>	<i>aeration chamber</i>	7.9	8.2	8.0	8.0	8.6
	<i>effluent</i>	6.5	7.0	7.0	6.9	7.3
<i>Temperature (°C)</i>	<i>influent</i>	19	19	19	18	18
	<i>aeration chamber</i>	18	18	18	18	19
	<i>effluent</i>	10	9	11	14	16
<i>pH</i>	<i>influent</i>	7.5	7.5	7.5	7.4	7.5
	<i>aeration chamber</i>	7.6	7.6	7.6	7.6	7.6
	<i>effluent</i>	7.9	7.9	7.8	7.8	7.8
<i>Biochemical Oxygen Demand (mg/L)</i>	<i>influent</i>	200	150	200	170	190
	<i>effluent</i>	10	<5	<5	<5	6
<i>Suspended Solids (mg/L)</i>	<i>influent</i>	200	170	220	130	200
	<i>aeration chamber</i>	6,600	6,200	6,900	6,800	6,400
	<i>effluent</i>	29	7	15	11	19
<i>Volatile Suspended Solids (mg/L)</i>	<i>influent</i>	160	150	190	110	170
	<i>aeration chamber</i>	4,300	4,100	4,600	4,600	4,300
	<i>effluent</i>	23	6	11	9	18
<i>45 Minute Settleable Solids (mL/L)</i>	<i>aeration chamber</i>	600	580	600	600	630

- (1) Site problem
- (2) Malfunction of system under test
- (3) Weather problem
- (4) Other

Notes:

NSF International
Standard 40 - Individual Wastewater Treatment Plants

Week Beginning: October 10, 1993

Plant Code: 9/109

Weeks Into Test: 27

Weekend Dosing: Sunday - 500 gallons Saturday - 500 gallons

		Monday	Tuesday	Wednesday	Thursday	Friday
<i>Dosed Volume (gallons)</i>		500	500	500	506	500
<i>Dissolved Oxygen (mg/L)</i>	<i>aeration chamber</i>	8.1	8.0	8.6	8.5	8.3
	<i>effluent</i>	7.3	(1)	6.7	6.8	6.6
<i>Temperature (°C)</i>	<i>influent</i>	18	18	18	18	18
	<i>aeration chamber</i>	17	17	17	17	17
	<i>effluent</i>	3	(1)	7	3	11
<i>pH</i>	<i>influent</i>	7.4	7.5	7.5	7.5	7.5
	<i>aeration chamber</i>	7.5	7.5	7.5	7.6	7.5
	<i>effluent</i>	7.8	(1)	7.7	7.7	7.7
<i>Biochemical Oxygen Demand (mg/L)</i>	<i>influent</i>	220	(1)	250	230	250
	<i>effluent</i>	8	(1)	8	6	5
<i>Suspended Solids (mg/L)</i>	<i>influent</i>	160	(1)	250	270	250
	<i>aeration chamber</i>	6,500	(1)	6,500	6,700	6,300
	<i>effluent</i>	20	(1)	20	14	12
<i>Volatile Suspended Solids (mg/L)</i>	<i>influent</i>	130	(1)	210	230	210
	<i>aeration chamber</i>	4,300	(1)	4,300	4,500	4,100
	<i>effluent</i>	16	(1)	16	12	8
<i>45 Minute Settleable Solids (mL/L)</i>	<i>aeration chamber</i>	600	600	600	530	600

- (1) Site problem
- (2) Malfunction of system under test
- (3) Weather problem
- (4) Other

Notes: No sample data on 10/11 due to problem with sampler.

NSF International
Standard 40 - Individual Wastewater Treatment Plants

Week Beginning: October 17, 1993

Plant Code: 9/109

Weeks Into Test: 28

Weekend Dosing: Sunday - 513 gallons Saturday - 500 gallons

		Monday	Tuesday	Wednesday	Thursday	Friday
Dosed Volume (gallons)		500	500	500	500	500
Dissolved Oxygen (mg/L)	aeration chamber	8.2	8.3	8.5	8.4	8.8
	effluent	6.5	7.2	7.5	7.0	7.5
Temperature (°C)	influent	18	18	18	18	18
	aeration chamber	18	17	17	17	17
	effluent	8	10	10	8	7
pH	influent	7.4	7.5	7.4	7.5	7.5
	aeration chamber	7.6	7.5	7.6	7.6	7.5
	effluent	7.8	7.7	7.7	7.8	7.8
Biochemical Oxygen Demand (mg/L)	influent	170	170	160	200	160
	effluent	7	7	6	5	5
Suspended Solids (mg/L)	influent	180	260	140	170	300
	aeration chamber	5,800	7,600	7,000	6,100	6,200
	effluent	14	24	16	12	10
Volatile Suspended Solids (mg/L)	influent	140	190	110	140	180
	aeration chamber	3,800	5,000	4,600	4,100	4,100
	effluent	11	19	13	10	9
45 Minute Settleable Solids (mL/L)	aeration chamber	600	600	590	600	600

- (1) Site problem
- (2) Malfunction of system under test
- (3) Weather problem
- (4) Other

Notes:

NSF International
Standard 40 - Individual Wastewater Treatment Plants

Week Beginning: October 24, 1993

Plant Code: 9/109

Weeks Into Test: 29

Weekend Dosing: Sunday - 500 gallons Saturday - 500 gallons

		Monday	Tuesday	Wednesday	Thursday	Friday
<i>Dosed Volume (gallons)</i>		500	500	500	500	500
<i>Dissolved Oxygen (mg/L)</i>	<i>aeration chamber</i>	8.5	8.5	8.6	8.9	8.5
	<i>effluent</i>	7.7	4.2	7.6	7.8	7.0
<i>Temperature (°C)</i>	<i>influent</i>	18	18	18	18	18
	<i>aeration chamber</i>	17	17	16	17	16
	<i>effluent</i>	6	9	13	3	13
<i>pH</i>	<i>influent</i>	7.6	7.4	7.5	7.5	7.5
	<i>aeration chamber</i>	7.4	7.6	7.4	7.5	7.4
	<i>effluent</i>	7.8	7.6	7.8	7.9	7.7
<i>Biochemical Oxygen Demand (mg/L)</i>	<i>influent</i>	170	150	190	170	150
	<i>effluent</i>	10	<5	6	<5	5
<i>Suspended Solids (mg/L)</i>	<i>influent</i>	160	180	210	130	290
	<i>aeration chamber</i>	7,100	5,600	7,400	6,900	6,200
	<i>effluent</i>	64	11	12	10	13
<i>Volatile Suspended Solids (mg/L)</i>	<i>influent</i>	130	140	170	110	240
	<i>aeration chamber</i>	4,500	3,500	4,900	4,500	4,100
	<i>effluent</i>	44	7	10	7	9
<i>45 Minute Settleable Solids (mL/L)</i>	<i>aeration chamber</i>	600	600	600	680	600

- (1) Site problem
- (2) Malfunction of system under test
- (3) Weather problem
- (4) Other

Notes: