MEMORANDUM

To: Joseph Alosso (Edgartown Wastewater Treatment Facility)

From: Louis Pettit (BBN Technologies, Cambridge, MA.)
(617)-873-3532

Date: 30 November 2000

Subject: Edgartown Wastewater Treatment Facility Noise Emissions

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EXECUTIVE SUMMARY

The Massachusetts Department of Environmental Protection (DEP) adopted a Noise Control Regulation, 310 CMR 7.10, under the authority of M.G.L. Chapter 111, Section 142B and 142D. The Noise Control Regulation is used to limit the sound impact of stationary sources and to respond to complaints of certain excessive sound, see Appendix A, pages 14-16.

Sound pressure level measurements presented in this report indicate that the Edgartown Wastewater Facility emits a pure tone noise level that is in violation of Massachusetts DEP regulations. Specifically, octave band noise levels were measured at a neighbor's residence. During the measurements the facility was operated in the condition commonly used for extended periods of time on nights during the summer months. That is (i) with the stack fan on high speed with inlet damper fully open, and (ii) with the mist system operational. Aerators were not operational at the time of noise measurements. During this operating condition of the facility, the noise level measured in the 500 Hz octave band at the neighbor's residence was 54.5 dB, and the noise levels measured in the two adjacent octave bands centered at 250 Hz and 1000 Hz were 44.2 dB and 42.5 dB, respectively. Thus a puretone condition with a maximum of 12 dB (54.5-42.5)was measured at the neighbor's facility. An excerpt taken directly from Massachusetts DEP regulations, see Appendix A, page 16, defines a puretone condition as follows:

> "**Puretone**: The sound pressure level, at any given octave band center frequency, that exceeds the levels of the two adjacent octave bands by three (3) or more decibels. In lay terms examples include a "squeaky" motor, screeching fan, etc.
>
> **Community Sound Level Criteria:**
>
> A facility will be considered to be in compliance with the 310 CMR 7.10(1) regulation if noise from the facility does not:
>
> 1. Increase the broad band noise level in excess of 10 dB(A) above ambient, or;
>
> 2. Produce a pure tone condition."

This report presents sound pressure level values that were measured to determine compliance with Massachusetts DEP regulations. This report also presents diagnostic sound pressure level measurements that were made and data analyses that were conducted to determine the cause of the puretone noise excess.

A recommended approach to reduce noise emissions is presented in this report for review and consideration by management at the Edgartown Wastewater Treatment Facility.

1.0 INTRODUCTION

The purpose of this memorandum is to:

(a) Present noise data measured at the Edgratown, MA. Wastewater Treatment Facility and at the neighboring residence of Mr. & Mrs. Raymond Snell of 3 Grey Gull Circle, Edgartown, MA.
(b) Compare measured noise data to Massachusetts regulatory requirements, and
(c) Recommend methods for controlling noise levels emitted by the wastewater treatment facility.

Sound pressure levels (SPL) were measured at the Edgartown Wastewater Treatment Facility (plant) and at the Snell residence on 22 September 2000 and 20 October 2000 during the approximate time period of 8 AM to 11 AM. An additional set of SPL measurements was made on the grounds of the facility on 21 October 2000. During the measurements the plant was operated in the condition commonly used for extended periods of time on nights during the summer months. That is (i) with the stack fan on high speed with inlet damper fully open, and (ii) with the mist system operational. Aerators were not operational at the time of noise measurements. This operational state was selected because, in the opinion of the wastewater facility personnel, complaints from neighbors are most commonly experienced when the plant operates at the conditions described above by (i) and (ii). This condition is referred to in this memorandum as the "high capacity" operating condition.

An additional set of SPL measurements were made while the plant was essentially secured, that is with the stack fan, the mist system and the aerators off. This latter set of SPL measurements were made to obtain "background" or ambient noise levels, that is noise levels that would be experienced if the plant were not operational.

SPL measurements were made for the purpose of comparing sound levels emitted by the plant to Massachusetts noise regulation requirements, i.e. 310 CMR 7.10(1) regulation. A copy of the applicable sections of 310 CMR 7.10(1) regulation pertaining to noise is given in Appendix A. In addition, a set of diagnostic SPL measurements were made to identify the source of the excessive noise, and the mechanism by which the noise is transmitted to the Snell residence. Measured noise data have been studied. Technical recommendations for reducing noise exposure at residences neighboring the plant are presented herein.

2.0 MEASURED SPL VALUES

Figure 1 presents a simplified plan view identifying significant structures at the plant, the Snell residence, and locations where SPL measurements were made. Numbers contained within rectangular boxes in Figure 1 identify locations where noise readings were made. Figure 1 is not a scaled drawing. The Snell residence is located approximately 500 hundred feet from the plant.

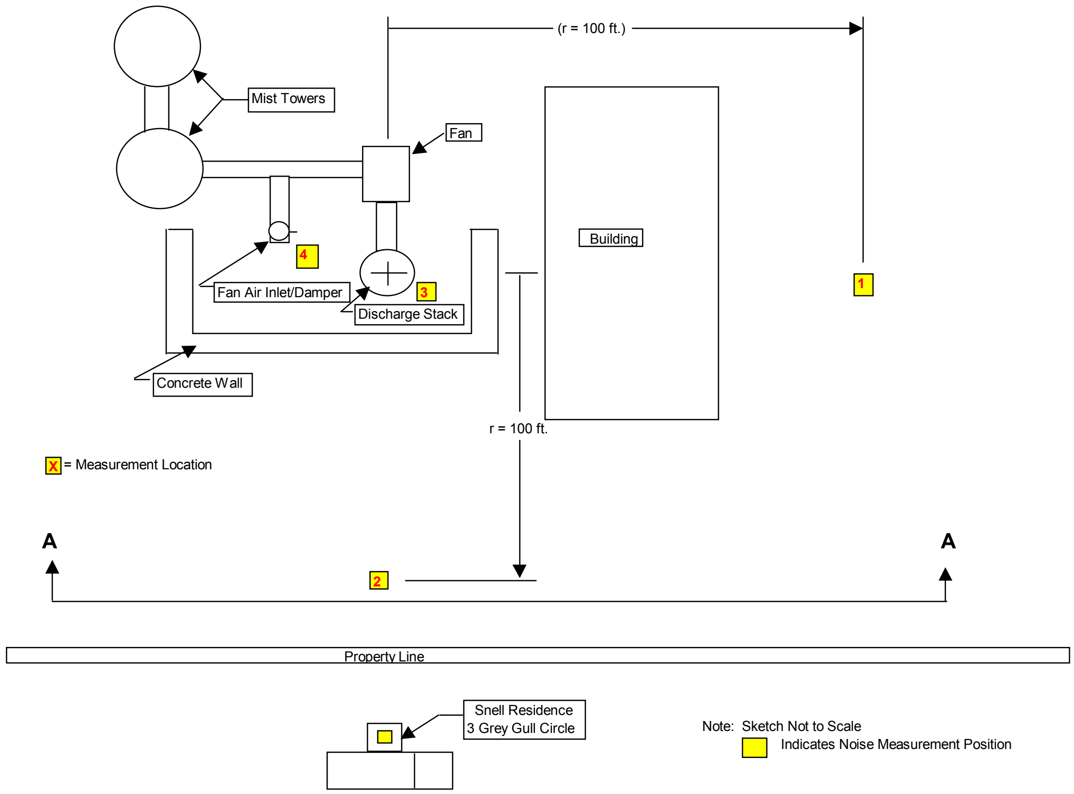

Figure 1(a) : PLAN VIEW

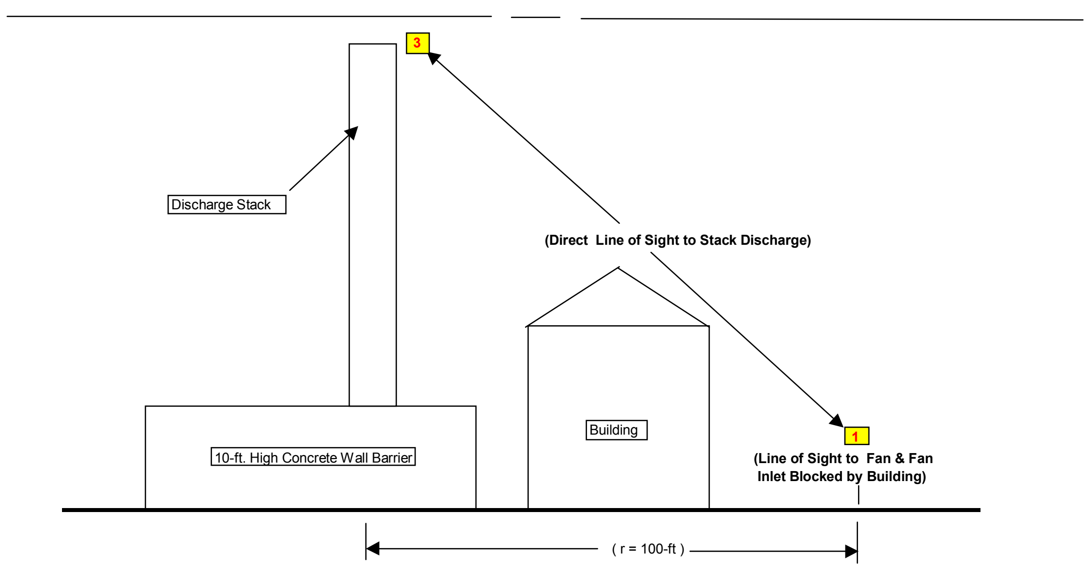

FIGURE 1(b): Elevation View A-A

All sound pressure level measurements were made with a microphone placed at a normal head height position, approximately 5 feet above ground level with the exception of the readings made at location [3]. Noise readings at position [3] were made while climbing a ladder and positioning the microphone approximately 2 feet from the outer wall of the stack and 2 feet above the stack discharge, off the center axis of the stack and out of the discharge stream.

Appendix B presents instrumentation used to conduct the noise level measurements, and also provides the dates when the instrumentation was laboratory calibrated. An octave band sound level spectrum analyzer was used. The system was calibrated before and after measurements. A windscreen was placed over the microphone for all noise measurements.

Table 1 identifies measurement locations and the numerical identifiers that were assigned to the particular noise spectra measured at specific locations. Measured noise data and corresponding numerical identifiers were stored in the sound level analyzer at the time of measurement. Table 1 also identifies the plant operating conditions that existed at the time each particular SPL measurement was made. Table 1 also lists the overall dBA noise levels that were measured at each microphone position during the specific plant operating condition identified.

Table 1: Sound Measurement Locations and Plant Operating Conditions During Measurements

Measurement Location	Spectra No. (Trace)	dBA	Plant Operating Condition	Mist	Fan Speed
1	1	67.8	Plant at High Capacity Operation, Fan & Mist Operational	On	High
2	2	67.3	Plant at High Capacity Operation, Fan & Mist Operational	On	High
3	3	97.3	Plant at High Capacity Operation, Fan & Mist Operational	On	High
4	4	90.8	Plant at High Capacity Operation, Fan & Mist Operational	On	High
1	5	63.3	Diagnostic Measurement: Fan Only Operation, Mist Secured	Off	High
2	6	65.5	Diagnostic Measurement: Fan Only Operation, Mist Secured	Off	High
4	7	90.0	Diagnostic Measurement: Fan Only Operation, Mist Secured	Off	High
2	8	50.0	Diagnostic Measurement: Mist Only Operation, Fan Secured	On	Fan Off
1	9	53.5	Fan Off, Mist Off - Background Noise at Position 1	Off	Fan Off
Snell's Deck	10	43.4	Fan Off, Mist Off - Background Noise at Snell's Deck	Off	Fan Off
Snell's Deck	11	52.2	Plant at High Capacity Operation, Fan & Mist Operational	On	High
Snell's Deck	12	53.1	Plant at High Capacity Operation, Fan & Mist Operational (Repeat)	On	High
Snell's Deck	13	52.3	Plant at High Capacity Operation, Fan & Mist Operational, A-Weighted	On	High

Table 2 presents lists the un-weighted octave band, overall A-weighted (dBA) level, and overall linear SPL readings. All noise levels are presented in units of decibel (dB) relative to 20 uPa (micro Pascal).

Octave band center frequencies listed in Table 2 are in units of Hertz, (Hz). Column entries in Table 2 are listed by spectrum (Trace) number. Column entries in Table 2 identify the octave band sound pressure level spectra measured for the corresponding trace entries identified in Column 2 of Table 1. For example, column entries in Table 2 under the heading Trace 10 are the background noise levels measured on the Snell's deck while the stack fan and the mist system were off. The octave band noise levels presented in Table 2 under the column headings identified as Trace 1, Trace 2, Trace 3, …Trace 12 are un-weighted octave band levels. The octave band noise levels presented in Table 2 under the column headings identified as Trace 13 are A-weighted octave band noise levels measured on the Snell's back deck while the plant was operating in the high capacity mode. This additional A-weighted spectrum was measured for diagnostic purposes and is discussed in section 3.0 of this memorandum. The overall A-weighted noise level and the overall linear noise level for each measured spectrum are also presented in Table 2.

Table 2: Un-weighted Octave Band, Overall dBA, and Overall Linear Sound Pressure Levels, dB re 20 uPa.

Octave Band	Trace 1	Trace 2	Trace 3	Trace 4	Trace 5	Trace 6	Trace 7	Trace 8	Trace 9	Trace 10	Trace 11	Trace 12	Trace 13
16	70.2	63.5	88.7	93.4	73.7	68.4	93.9	60.6	59.3	50.8	58.6	56.4	1.9
31.5	65.3	65.7	93.7	90.8	68.9	66.0	88.4	55.3	58.3	44.9	54.5	53.7	15.1
63	64.3	68.0	93.1	87.6	63.7	68.5	87.3	55.0	59.9	42.6	53.3	54.1	27.1
125	57.9	64.8	91.6	92.5	56.9	63.6	92.1	49.7	52.1	40.7	46.4	45.0	30.3
250	56.6	59.8	89.9	86.3	56.9	58.7	85.7	45.1	45.0	37.9	44.2	45.9	35.6
500	71.8	70.2	99.8	92.4	65.5	68.2	90.9	43.1	35.1	36.9	54.5	55.3	51.3
1000	50.1	54.0	87.9	83.3	50.6	52.2	81.7	43.2	41.9	36.0	42.5	42.7	42.5
2000	41.2	41.4	77.4	76.4	39.8	46.9	78.7	42.8	38.7	33.9	34.2	35.2	35.4
4000	50.6	37.4	70.0	69.9	52.7	45.7	77.0	44.0	51.7	38.7	36.4	38.6	37.4
8000	35.9	29.7	60.2	62.2	32.2	38.3	74.4	37.8	31.1	34.4	34.3	35.8	33.2
16000	25.3	16.7	46.9	51.8	22.2	19.4	63.7	20.8	19.4	18.8	18.7	21.4	12.1
Overall (dBA)	68.7	67.3	97.3	90.8	63.3	65.5	90.0	50.0	53.5	43.4	52.2	53.1	52.3
Overall Linear	74.8	74.3	102.5	99.1	75.8	74.5	98.6	63.1	64.6	53.2	62.0	61.4	62.0

3.0 ANALYSIS OF MEASURED NOISE DATA

SPL data were analyzed for (a) comparison of measured noise levels with regulatory requirements and (b) to develop noise reduction recommendations.

3.1 Comparison of Measured SPL Data with Regulatory Requirements

Appendix A summarizes regulatory requirements pertaining to noise as imposed by the DEP within Massachusetts.

Figure 2 presents a plot of un-weighted octave band noise levels measured at the Snell's deck when the plant was operating in high capacity mode; that is when the stack fan was on high speed with the damper fully open, with the mist system operational. Figure 2 also presents a graph of the un-weighted octave band noise levels measured at the Snell's deck when the stack fan and the mist system were secured, i.e. the background noise levels.

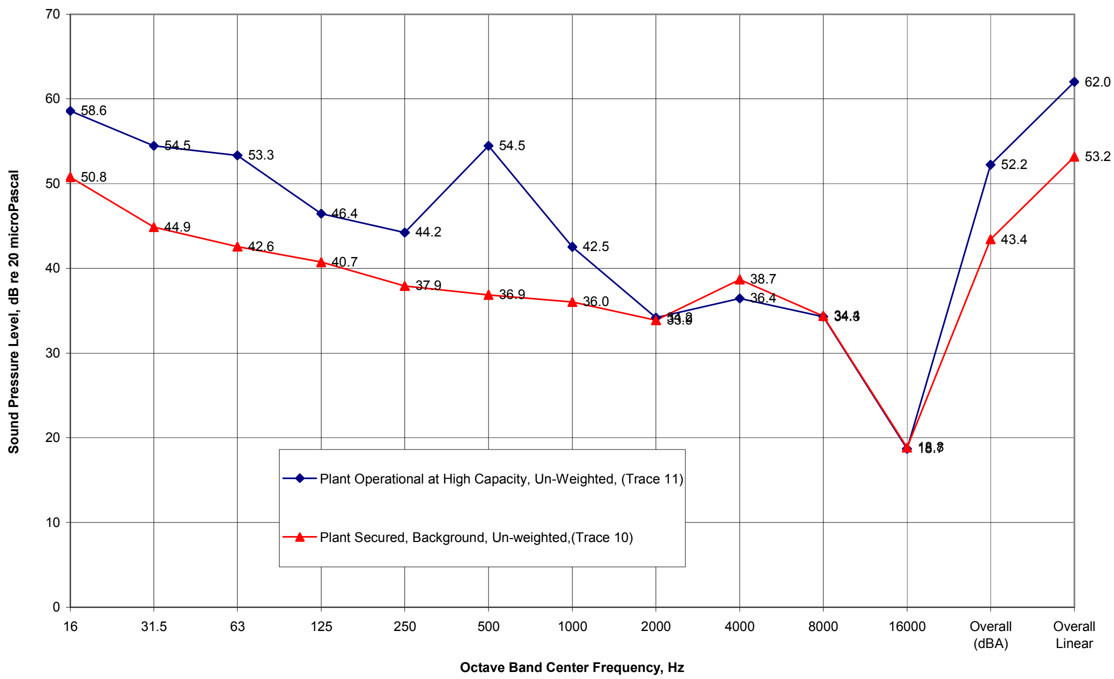

Figure 2: Noise Levels Measured on the Snell's Back Deck for Various Operating Conditions of the Plant

Study of the noise levels measured on the Snell's deck as presented in Figure 2 and Table 2 reveals the following:

- The overall dBA sound pressure level measured when the plant is operating at high capacity, that is with the stack fan on high speed and with the mist system operational, is 52.2 dBA. This level is only 8.8 dB, (52.2 – 43.4), above the ambient noise level of 43.4 dBA. This increase in overall A-weighted sound level above the background level (i.e. the ambient) is not in violation of regulatory requirements stated in Massachusetts Division of Air Quality Control and adopted by the Department of Environmental Protection, 310 CMR 7.10, see Appendix A.
- With the stack fan and mist systems "off", the un-weighted noise level in the 500 Hz octave band is 36.9 dB. When the stack fan is on high speed and the mist systems are "on", the un-weighted noise level in the 500 Hz octave band increases by 17.6 dB to a level of 54.5 dB. The increase in the noise level in the 500 Hz octave band is the result of plant operation, since as can be seen from Figure 2, the un-weighted noise level in the 500 Hz octave band drops to 36.9 dB when the plant is secured.
- When the plant is operating in the high capacity mode, that is with the stack fan on high speed and with the mist systems operational, the sound level in the 500 Hz octave band is 54.5 dB, the sound level in the 1000 Hz octave band is 42.5 dB, and the sound level in the 250 Hz octave band is 44.2 dB. Thus when the plant is operating in the high capacity mode, the sound level in the 500 Hz octave band is 10.3 dB (54.5-44.2) above the level in the adjacent 250 Hz band and 12.0 dB (54.5-42.5) above the level in the adjacent 1000 Hz octave band.

Thus, when the plant is operating in the high capacity mode, that is with the stack fan on high speed and with the mist systems operational, the sound produced by the plant is in violation of the following regulation, imposed by the DEP, see Appendix A:

> "A source of sound will be considered to be in violating the Department's noise regulation (310 CMR 7.10) if the source produces a "pure tone" condition – when any octave band center frequency sound pressure level exceeds the two adjacent center frequency sound pressure levels by 3 decibles or more."

3.2 Noise Reduction Analysis

In order to achieve compliance with the pure tone requirement imposed by the DEP, the sound pressure level in the 500 Hz octave band would have to be reduced by a minimum of 9 dB, (12-3), in order for it to be no greater than 3 dB above the magnitude of the sound pressure level in the adjacent octave band centered at 1000 Hz. This analysis has identified the magnitude of noise reduction required (9 db) and the octave band in which the noise reduction is required (500 Hz). However, the specific source of the noise excess and the mechanisms by which noise is transmitted also need to be identified in order to make valid conclusive noise control recommendations. To accomplish this, several sets of diagnostic noise measurements were taken on the grounds of the wastewater treatment facility to determine to cause of the high sound levels in the 500 Hz octave band. These diagnostic data are also listed in Table 2. Review of Table 2 indicates that the noise spectra measured at all of the microphone positions show high magnitude sound pressure levels in the 500 Hz octave band as compared to the magnitudes of the sound levels in the other octave bands.

The likely sources of the high magnitude sound pressure level in the octave band centered at 500 Hz at the Snell Residence appear to be (a) noise emitted by the opening at the termination of the discharge stack, (b) noise emitted by the intake air opening and damper serving the fan, and (c) noise emitted by the mist towers. The following study reveals which of these sources is the dominant source of the sound level measured at the Snell residence.

Figure 3 presents SPL measurements made at position 2 (see Figure 1) for two different operating conditions of the plant. Study of the Figure 3 plots indicates that the controlling source of the noise in the 500 Hz octave band during normal operation of the plant is not the operation of the mist systems, but rather the operation of the stack fan. Knowing that the stack fan is the cause of the high noise levels, the following question must now be answered. Is it:

(a) Stack fan noise transmitted from the discharge opening at the top of the stack or
(b) noise radiated from the stack fan casing in combination with stack fan noise emitted from the air inlet opening (see Figure 1) that is subsequently transmitted over the concrete wall, or
(c) the combination of the sound contributions described above in (a) and (b) that control the magnitude of the 500 Hz octave band noise level measured at the Snell residence?

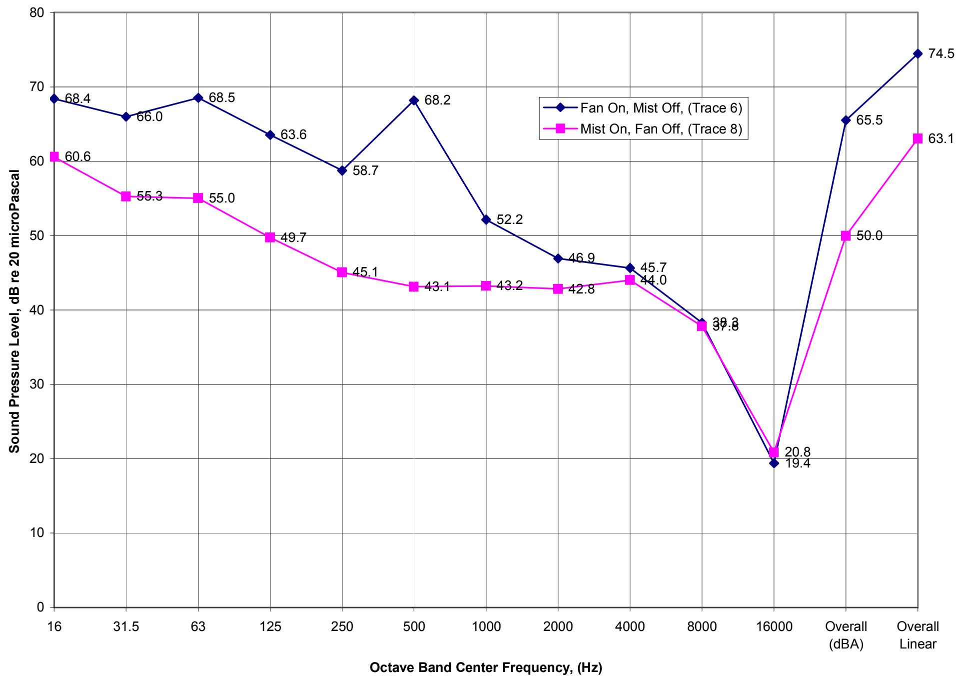

Figure 3: Diagnostic Sound Pressure Levels Measured at Position 2 for Two Different Operating Conditions of the Plant

Figure 4 presents a comparison of sound pressure levels measured at position 3, (directly adjacent to the top of the stack) with sound pressure levels measured at position 4. Position 4 is directly adjacent to the stack fan inlet air opening/damper, which is approximately 4.5 feet above ground level.

Study of Figure 4 indicates that for the 500 Hz octave band, the noise emitted from the discharge opening at the top of the stack is 7.4 dB, (99.8 - 92.4), greater in magnitude than is the noise emitted from inlet air/damper and casing of the stack fan. The noise emitted from the stack fan inlet air/damper and fan casing was measured with a microphone placed directly adjacent to the fan air inlet opening.

Figure 5 presets a comparison of sound pressure levels measured at positions 1 and 2 during high capacity operation of the plant. Positions 1 and 2 are both located equidistant, approximately 100 feet, from the center of the discharge stack. Figure 1(a) and Figure 1(b) illustrate that position 1 and position 2 both have a direct line of sight access to the top of the stack. Figure 1(b) illustrates that measurement position 1 affords a direct line of sight view to the top of the discharge stack, but does not provide any line of sight access to the fan casing and fan inlet/ damper since the intervening building is nearly as high as the stack. At position 1 it is expected that noise contributions emitted by the fan/motor casing and by the fan air inlet/ damper are significantly attenuated. Thus sound levels at position 1 are estimated to be controlled by only the noise contributions emitted from the opening of the discharge stack. At position 2 there is direct line of sight view to the top of the discharge stack and also to the top of the concrete wall barrier. Thus it is expected that the noise levels measured at position 2 are a combination of noise contributions from the stack discharge and noise contributions emitted by the fan/motor casing and air inlet/ damper that escape over the top of the concrete wall. If significant noise contributions escape over the top of the wall, the noise levels at position 2 are expected to be greater than the noise levels at position 1.

Study of Figure 5 reveals that for the 500 Hz octave band, the 71.8 dB noise level measured at position 1 is essentially equal, within measurement accuracy, to the level measured at position 2 for the 500 Hz octave band, 70.2 dB. This fact suggests, when considering the layout information presented in the immediately preceding paragraphs, that noise emitted from the top of the stack is responsible for the far field noise level measured at the Snell residence.

Thus, it can be concluded that a reduction in the 500 Hz octave band sound level that is emitted from the top of the stack is a necessary step in order to achieve compliance with Massachusetts DEP requirements, condition 2 of Appendix A. The minimum reduction in the sound level emitted from the stack discharge that is needed in order to achieve compliance with the DEP regulation is 9 dB for the 500 Hz octave band. To account for variability in the noise measurements a goal of 12 dB reduction should be assigned as a minimum. Achieving this will bring the level in the 500 Hz octave band down to 41.5 dB. If this amount of noise reduction were accomplished, achieving compliance with DEP regulations would also require that the silencing not provide more than 4.7 dB (44.2-39.5) in the 250 Hz octave band and not more than 3 dB (42.5-39.5) in the 1000 Hz octave band in order for the puretone requirement to also be achieved. Obviously there is more than one set of noise reduction values for the 250, 500, and 1000 Hz octave bands that will provide a satisfactory solution.

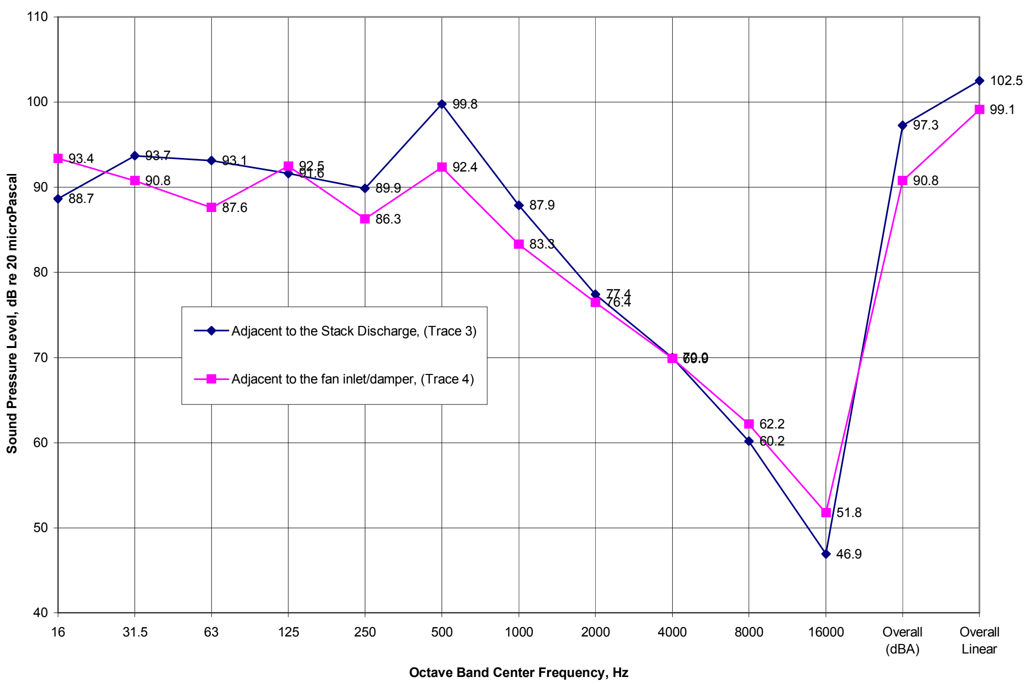

Figure 4: Sound Pressure Levels Measured at Positions 3 and 4 for Plant Operation in the High Capacity Condition

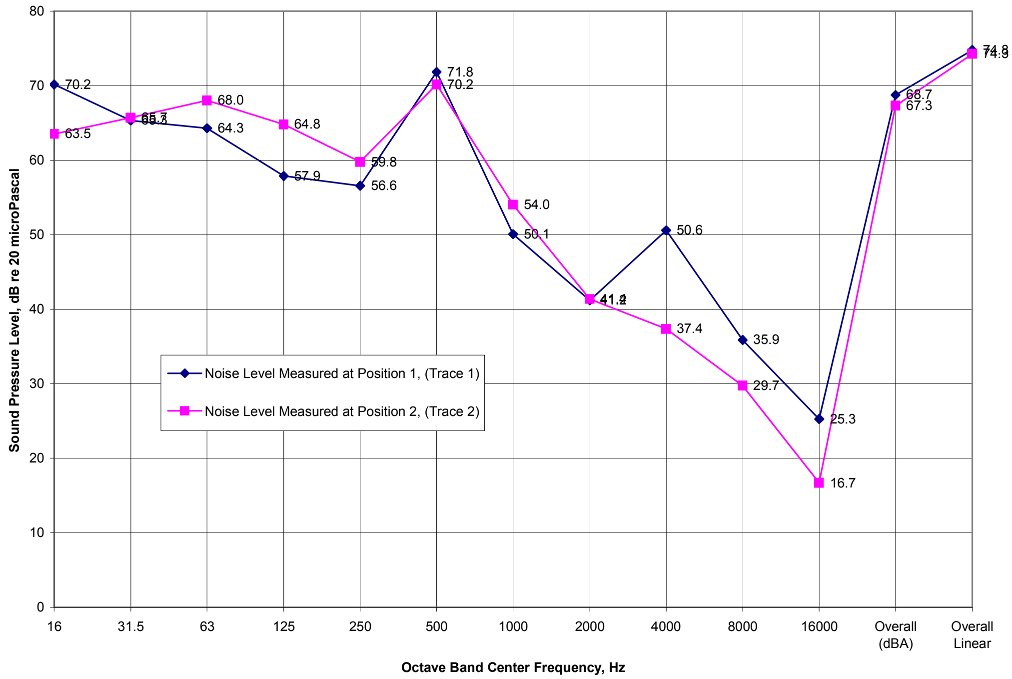

Figure 5: Sound Pressure Levels Measured at Positions 1 and 2 For Plant Operation in the High Capacity Condition

4.0 NOISE CONTROL RECOMMENDATIONS

Recommendation 1: The town of Edgartown should undertake an independent study to verify the findings of this memorandum.

Recommendation 2: Should the findings of this study be confirmed, installation of a silencer in the discharge stack could be considered. A stack silencer providing a 12 dB noise reduction (dynamic insertion loss) in the 500 Hz, and not more than 5 dB in the 250 Hz and not more than 3 dB in the 1000 Hz octave band could be considered. The silencer could be incorporated into the construction of the discharge stack. This memorandum should be given to a silencer manufacturer to assist in the design of the silencer, since other combinations of octave band attenuation may be satisfactory. One option would be to procure a silencer that provides a minimum dynamic insertion loss of 6, 18, and 7 dB in the octave bands centered at 250, 500, and 1000 Hz, respectively. This approach would bring noise levels in these octave bands down to the ambient level, and thus the puretone condition would no longer be a consideration.

The narrowband spectra given in Figure 6 will assist in the silencer design. A recommended firm who could design and fabricate a silencer with suitable sound attenuation characteristics is Industrial Acoustics Company, Inc., (IAC) Bronx, New York 718-931-8000, contact Mr. Chris Carlson. Information such as flow rate, allowable pressure drop, etc. will need to be provided to the silencer manufacturer.

More than one option is available for a silencer. IAC manufactures a line of “center body silencers” that may be ideally suitable for this application. A center body silencer consists of a bullet shaped silencer that has an outer diameter that is much less than the inside diameter of the existing discharge stack. A center body silencer is fabricated with radial struts that fasten to the interior of the wall of the existing stack in order to support the weight of the silencer. Such a center body silencer could be lowered into the existing stack and secured in place. Use of a center body silencer would negate the need for significant and costly modifications to the existing stack to accommodate a conventional silencer with bolted flange connections. The suitability of a center body silencer will depend on flow dynamics, allowable pressure drop, acoustic performance, and compatibility with the chemical and moisture environment within the stack. Most likely a center body silencer of stainless steel construction would be needed.

A more conventional type of silencer having the same 42-in. diameter as the existing stack may be suitable. The casing of the silencer could be fabricated of the same fiberglass material as the existing stack. If sound absorptive material is installed within the interior of the silencer, the absorptive material should be covered with a moisture proof facing material such as Tedlar. The moisture proof facing will permit the silencer to function properly when exposed to the mist generated by the mist towers and when exposed to weather. The existing discharge stack is one continuous fiberglass piece. The silencer could be fabricated with a slip joint construction at either end. The stack could be cut through its cross section at approximately 6 to 7 feet above where the fan discharges into the stack, then removing the upper section of the stack. The silencer could be inserted in place of the removed section of stack. Depending on the length of the silencer, a section of the original stack could be installed at the discharge end of the silencer so that the stack discharge opening is approximately the same height as the existing stack, 32 feet.

Recommendation 3: On 4 November audibly high noise levels were again detected at the Snell residence at approximately 7:30 AM. No sound level meter was available to measure the magnitude of the noise levels. Upon inspection of the Edgartown Wastewater Treatment Facility, it was observed that the mist towers, and stack discharge fan were not operational. It was observed that two aerators of the four aerators at the Edgartown Wastewater Treatment Facility were operational.

A parallel study should be undertaken to determine if the sound levels emitted when the aerators are operational are in violation of Massachusetts regulations. If that study reveals that operation of the aerators results in excessive noise levels at neighboring residences bordering the Wastewater Facility, the study should be expanded to determine what measures need to be developed and implemented to reduce emitted noise levels to comply with state regulations.

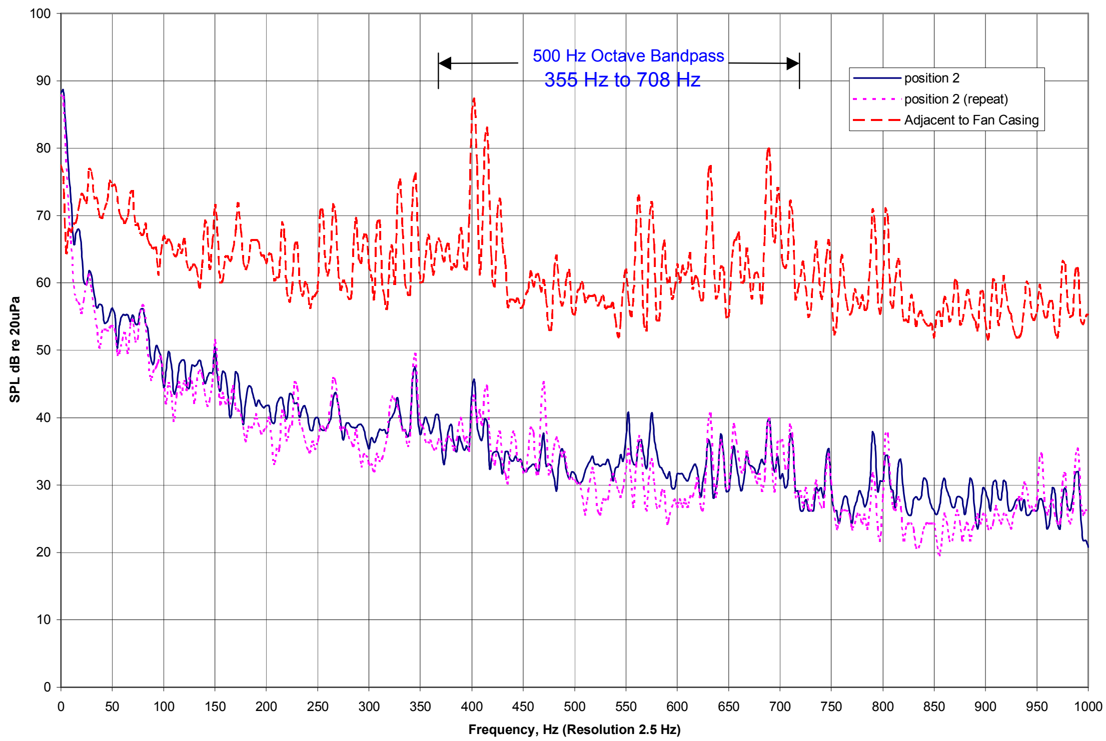

Figure 6: Narrowband Noise Spectra measured on 10 October, 2000

APPENDIX A: NOISE REGULATIONS

The Commonwealth of Massachusetts
Executive Office of Environmental Affairs
Department of Environmental Quality Engineering
Division of Air Quality Control
One Winter Street, Boston 02108

February 1, 1990

DAQC Policy 90-001

DIVISION OF AIR QUALITY CONTROL POLICY

This policy is adopted by the Division of Air Quality Control. The Department's existing guideline for enforcing its noise regulation (310 CMR 7.10) is being reaffirmed.

P O L I C Y

A source of sound will be considered to be violating the Department's noise regulation (310 CMR 7.10) if the source:

1. Increases the broadband sound level by more than 10 dB(A) above ambient, or

2. Produces a "pure tone" condition - when any octave band center frequency sound pressure level exceeds the two adjacent center frequency sound pressure levels by 3 decibels or more.

These criteria are measured both at the property line and at the nearest inhabited residence. Ambient is defined as the background A-weighted sound level that is exceeded 90% of the time measured during equipment operating hours. The ambient may also be established by other means with the consent of the Department.

Approved: February 1, 1990 Effective: Immediately

Barbara A. Kwetz
Acting Director
Division of Air Quality Control

DEP Bureau of Waste Prevention Noise Policy

February 1, 1990 DAQC Policy 90-001

The Massachusetts Department of Environmental Protection (DEP) adopted a Noise Control Regulation, 310 CMR 7.10, under the authority of M.G.L. Chapter 111, Section 142B and 142D. The Noise Control Regulation is used to limit the sound impact of stationary sources and to respond to complaints of certain excessive sound. The Department's Noise Control Regulation can be enforced by local officials under the authority of 310 CMR7.52 which states:

Relevant Definitions

When used in 310 CMR 7.00 or in communications, notices or orders relative thereto, the following words and phrases shall have the meanings ascribed to them below:

- Noise means sound of sufficient intensity and/or duration as to cause or contribute to a condition of air pollution.

7.52 U Enforcement Provisions

"Any police department, fire department, board of health officials, or building inspector or his designee acting within his jurisdictional area is hereby authorized by the Department to enforce, as provided in M.G.L. c. 111, S142B, any regulation in which specific reference to 310 CMR 7.52 is cited."

Noise is defined in the Regulations as "...sound of sufficient intensity and/or duration as to cause or contribute to a condition of air pollution."

The Noise Regulation states:

310 CMR 7.10 - U Noise

1. No person owning, leasing, or controlling a source of sound shall willfully, negligently, or through failure to provide necessary equipment, service, or maintenance or to take necessary precautions cause, suffer, allow, or permit unnecessary emissions from said source of sound that may cause noise.

2. 310 CMR 7.10(l) shall pertain to, but shall not be limited to, prolonged unattended sounding of burglar alarms, construction and demolition equipment which characteristically emit sound but which may be fitted and accommodated with equipment such as enclosures to suppress sound or may be operated in a manner so as to suppress sound, suppressible and preventable industrial and commercial sources of sound, and other man-made sounds that cause noise.

3.310 CMR 7.10(l) shall not apply to sounds emitted during and associated with:

a. parades, public gatherings, or sporting events, for which permits have been issued provided that said parades, public gatherings, or sporting events in one city or town do not cause noise in another city or town;
b. emergency police, fire, and ambulance vehicles;

c. police, fire, and civil and national defense activities;
d. domestic equipment such as lawn mowers and power saws between the hours of 7:00 A.M. and 9:00 P.M.

4.(4) 310 CMR 7.10(l) is subject to the enforcement provisions specified in 310 CMR 7.52.

The Department has established a Noise Level Policy for implementing this regulation. The policy specifies that
the ambient sound level, measured at the property line of the facility or at the nearest inhabited buildings, shall not be increased by more than 10 decibels weighted for the "A" scale [dB(A)] due to the sound from the facility during its operating hours.

Ambient Ground Level - the sound from all sources other than the particular sound of interest (background sound level). The ambient sound measurement (A-Weighted Noise Level) is taken where the offending sound cannot be heard,, or with the sound source shut-off. The ambient sound level is rarely found to be constant over time, and is usually quite variable (considered to be the level that is exceeded 90% of the time that the noise measurements are taken).

dB(A) is a unit of sound measurement where the actual sound measurement (in decibels) is altered (or weighted) to reflect. Human sound sensitivity. For instance, for those frequencies of sound which humans hear very well, the actual reading is enhanced, or increased, in the weighting process. The "weighted" reading therefore emphasizes the frequencies, best heard by humans, and likewise de-emphasizes those sound frequencies which are less well heard.

The guideline further states that the facility shall not produce a puretone condition at the property line (or at the nearest inhabited buildings).

Puretone The sound pressure level, at any given octave band center frequency, that exceeds the levels of the two adjacent octave bands by three (3) or more decibels. In lay terms examples include a "squeaky" motor, screeching fan, etc.

Community Sound Level Criteria:

A facility will be considered to be in compliance with the 310 CMR 7.10(1) regulation if noise from the facility does not:

1. Increase the broad band noise level in excess of 10 dB(A) above ambient, or;

2.Produce a pure tone condition.

APPENDIX B: MEASUREMENT INSTRUMENTATION

TABLE B.1: INSTRUMENTATION AND CALIBRATION DATES

Manufacturer	Instrument Type	Model	Serial Number	Calibration Date
ACO Pacific	Microphone	7046I	20020	July 13, 2000
ACO Pacific	Acoustical Interface	PS9200	200206-1	July 13, 2000
ACO Pacific	Preamplifier	4012	200206-2	July 13, 2000
Bruel & Kjaer	Sound Level Calibrator	4230	1350487	April 11, 2000
Hewlett Packard	Signal Analyzer	3569A	32222A00192	February 26, 2000