EBC Noise Program

MassDEP Noise Policy Implementation – Have You Heard About It?
Welcome

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Program Introduction & Overview

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EBC Noise Program
MassDEP Noise Policy Implementation
Have You Heard About It?

PROGRAM INTRODUCTION & OVERVIEW
March 28, 2018
Presented by:
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About ESS Group, Inc.

- Multi-disciplinary environmental consulting and engineering firm serving energy and industrial markets
- Under current ownership since 1997
- Offices in Waltham, MA and East Providence, RI
The MassDEP regulates noise as an air pollutant:

310 CMR 7.10(1)

No person owning, leasing, or controlling a source of sound shall willingly, 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.
DAQC Policy 90-001 (February 1, 1990)

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.
Noise levels that exceed the criteria at the source’s property line by themselves do not necessarily result in a violation of air pollution under MassDEP’s regulations.

- A new noise source will be required to mitigate its sound emissions if they are projected to cause the broadband sound level at a residence or building housing sensitive receptors to exceed ambient background by more than 10 dB(A).

- A new noise source that would be located in an area that is not likely to be developed for residential use in the future, or in a commercial or industrial area with no sensitive receptors may not be required to mitigate its noise impact in those areas, even if projected to cause noise levels at the facility’s property line to exceed ambient background by more than 10 dB(A).
Historically, Massachusetts air plan approval applicants proposing new sources which will increase sound levels at their property line have done the following to comply with the MassDEP Noise Policy:

1. Conduct ambient sound measurements at the proposed property line and at nearby sensitive receptors during different time periods (day/night, weekday/weekend) to establish the background sound level ($L_{90}$) which is exceeded 90% of the time.

2. Conduct noise propagation modeling to predict the maximum operational sound levels at the property line and at the nearby sensitive receptors during worst-case facility operations (all equipment operating at the same time).

3. Compare the predicted maximum operational sound levels at each location with the measured background sound levels. If there are no predicted increases more than 10 dB(A), compliance has been demonstrated. If there is an increase greater than 10 dB(A), repeat modeling with mitigation until compliance is demonstrated.
Introduction

When proposing sound suppression/mitigation measures, similar to the traditional “top-down” BACT process, the “top case” sound suppression/mitigation measures which deliver the lowest sound level increase above background are required to be implemented, unless these measures can be eliminated based upon technological or economic infeasibility. An applicant cannot “model out” of the use of the “top case” sound suppression/mitigation measures by simply demonstrating that predicted sound levels at the property line when employing a less stringent sound suppression/mitigation strategy will result in a sound level increase of less than or equal to the 10 dBA above background sound level increase allowed by the MassDEP; it is not the sound level increase upon which the design of sound suppression/mitigation strategies should be based. Also, take into consideration that the city or town that the project is located in may have a noise ordinance that may be more stringent than the criteria in the MassDEP Noise Policy.
MassDEP “New” Noise Policy Interpretation?

**Issues with the “New” Noise Policy Interpretation**

- The Noise BACT requirement is not being enforced consistently – some long term regional MassDEP AQ staff are not even aware of the requirement

- **BACT for most stationary air pollution sources is well established:**
  - The available control technologies are limited and known
  - The control efficiencies of the available control technologies are known
  - Control cost thresholds ($/ton) have been established and are known

- **BACT for noise mitigation measures has not been established:**
  - The available mitigation measures are virtually unlimited when you consider that walls of different materials can theoretically be placed at any relative distance/direction/orientation from the source and at any height
  - The control efficiencies of the available mitigation measures can only be determined through iterative modeling, which can make determining the top case measures problematic
  - Control cost thresholds ($/dB(A)) have not been established – how much is too much to spend to achieve how much of an increase?

- Applicants are left without noise mitigation cost or design certainty until their application is reviewed
Conclusions

- Applicants for a MassDEP Air Plan Approval may be required to demonstrate compliance with the MassDEP Noise Policy.
- The MassDEP Noise Policy as written is clear-cut and historically it has been relatively straightforward for applicants to demonstrate compliance.
- The MassDEP is now requiring some applicants to go beyond compliance and propose the “top case” mitigation measures which deliver the lowest sound level increase, unless these measures are economically or technologically infeasible.
- The thresholds for determining whether proposed mitigation measures are “top case” or if they are economically or technologically infeasible are unclear, leaving applicants without cost or design certainty when it comes to noise mitigation.
- Additional clarification from the MassDEP on their planned implementation of the Noise Policy going forward would provide applicants with more cost and design certainty for future projects.
Thank you. Any questions?

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MassDEP and Municipal Legal Authority to Regulate Noise

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MassDEP and Municipal Legal Authority to Regulate Noise

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March 28, 2018
STATE LAW AUTHORITY TO REGULATE NOISE

- Sources of Authority – Massachusetts Clean Air Act M.G.L. Chapter 111, Sections 142A-M and the MassDEP Air Pollution Control Regulations 310 CMR 7.00.

- Regulations provide little guidance on noise regulation.

- “Noise” defined as “sound of sufficient intensity and/or duration as to cause a condition of air pollution.”

- “Air pollution” in turn defined as:

  The presence in the ambient air space of one or more air contaminants or combinations thereof in such concentrations and of such duration as to:
  
  • Cause a nuisance;
  • Be injurious or potentially injurious to human health or animal life, to vegetation, or to property;
  • Unreasonably interfere with the comfortable enjoyment of life and property.
Noise pollution is prohibited in 310 CMR 7.10(1), which provides that:

A 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.

Specific examples of violations:
- Prolonged and unattended sounding of burglar alarms;
- Operation of construction equipment without noise controls.

Broadly interpreted and can also cover “other man-made sounds that cause noise.”

Certain activities exempted:
- Parades, sporting events;
- Emergency vehicles;
- Domestic equipment such as lawn mowers and power saws between 7 am and 9 pm.
HOW DOES DEP EVALUATE NOISE IMPACTS?

- Applications for new sources of air pollution.

- DEP looks at the potential increase in sound levels over ambient conditions and the impacts of noise.
A source of sound will be considered to be violating the Department’s noise regulation (310 CMR 7.10) if the source:

1. Increased 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.

Measured 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.
Established January 2018

When does DEP evaluate noise?

1. When DEP reviews applications for approval under its air pollution regulations – typically large commercial and industrial facilities

2. In response to complaints from the public
DEP ENFORCEMENT

- Clean air act provides DEP with authority to issue fines up to $25000 day for violations.

- Dep involvement usually in noise issues usually occurs when a project requires a DEP issued permit.

- If there are noise complaints DEP will investigate.

- Violations will result in a notice of non-compliance.

- Most likely result is an administrative consent order that requires mitigation.

- Can revoke permits in extreme situations.
DEP ENFORCEMENT (con’t)

- DEP enforcement is rare.

- DEP website has only a few examples of noise enforcement over the last 3 years.

- DEP has broad enforcement authority but it is rare for DEP to issue a NON to a noise generator that does not have a DEP permit.
APPEALS / DEP

- NON can be appealed like any other DEP enforcement order.
- Appeal goes to Office of Administrative Dispute Resolution (OADR).
- Sometimes appeal is brought by neighbors opposed to new or expanded facility see Century Acquisition, Inc. OADR Docket No 2011-25 and 26.
MUNICIPAL REGULATION OF NOISE

- Most municipalities have a noise ordinance
- Often based on MNS
- Enforcement depends on the terms of the ordinance
- Most typically a board of health by law enforced through the local health event
- Building inspector may also have enforcement authority
MUNICIPAL ENFORCEMENT DIFFICULT

- Ordinances often vague.

- Building inspectors and board of health agents are not noise experts.

- Sensitivity to noise can be subjective.

- Large industrial and commercial facilities are often large employers.

- Very little case law
  - Glass v Marblehead Board of Health, Mass. Superior Court No. 2007-05499
MUNICIPAL REMEDIES

- Fine - but probably limited to $300 day.

- Injunction from superior court ordering noise source shut down.

- Injunction remedy unlikely unless compelling public safety or health issue.
MUNICIPAL ENFORCEMENT OF 310 CMR 7.00

- 310 CMR 7.52 authorizes boards of health to enforce DEP noise regulations.
- Confirmed in Glass
- In community with no noise ordinance board of health can act against excessive noise.
- If there is municipal ordinance then can seek enforcement under both clean air act and local ordinance.
- $25,000 day fines?
APPEALS

- Some ordinances provide appeal to town board such as board of health.

- If zoning based any order of building inspector can be appealed to zoning board of appeal.

- If no appeal process provided by ordinance then can appeal to superior court.
DEP ENFORCEMENT

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(1) 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(1) 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) 310 CMR 7.10(1) is subject to the enforcement provisions specified in 310 CMR 7.52.
Noise Concerns in an Industrial Setting

Joseph Dufresne

Manager, Site Environmental Compliance and Planning

Saint-Gobain Abrasives
OUR SETTING

• Manufacturing operations began on site in 1885

• 24/7 365 day operation

• Approximately 50 control devices with blowers or fans, most running 24/7

• Situated in a valley

• Residential housing developed around the complex

• New housing developments built in the 1990s are “above” the complex
Each company has air permitting requirements overseen by the Massachusetts Department of Environmental Protection (MassDEP).

When neighbors express a concern of noise, the MassDEP may impose additional requirements for permitting external manufacturing operations equipment, including:

- Requirements to submit a noise test protocol with an equipment application
- Hiring of a noise consultant to test the area during times when there is limited “background” noise, such as a highway
- Submit a report to the MassDEP with details of the findings
EXPERIENCE OF PAST 10 YEARS

• Common fence line neighbor issues may include:
  ▪ back-up alarms on trucks and plows
  ▪ fans and condensers
  ▪ low frequency emissions

• Make all fence line neighbor concerns a priority and determine the root cause of the noise as soon as possible through engagement and study

• Work in concert with local regulators and stakeholders, such as:
  ▪ Affected neighbors
  ▪ Local city/town Inspectional Services
  ▪ Massachusetts Department of Environmental Protection
  ▪ Local Police Department
  ▪ Local Fire Department
HOW CAN I HELP?

• Identify and hire qualified noise consultants to assist in identifying the root cause of the noise

  ▪ Visiting neighbors at their homes to learn their concerns
  ▪ Setting-up equipment on neighbor’s property to collect data on noise exposure
  ▪ Sampling at the property line to determine any changes in decibels
  ▪ Arranging for manufacturing operations equipment to be turned on/turned off while at the neighbors home to narrow down potential cause

• Sometimes, the noise isn’t related to the company!
CASE STUDY: NOISE MITIGATION PROJECT

• Received multiple neighbor concerns who described the noise as a “vibration”

• Conducted a noise study at neighbor homes to identify the issue

• Learned a pair of dust collectors were giving off a low frequency vibration, particularly during the winter and often when our operations were not being fully utilized (weekends/holidays)

• Hired a third-party consultant

• Designed a plan to modify the blower fans

• Issue resolved
WHAT HAVE I LEARNED

• It is often difficult to identify the offending equipment when you have many units operating

• Period of the most frequent neighbor concerns often do not coincide with manufacturing activity

• There is a very real emotional side to noise concerns

• Importance of expertise and high-technology equipment a typical EHS Department does not have
  ▪ Sometimes “thinking out of the box” ideas need to be applied!

• Solving concerns may be very time consuming and expensive
ADDITIONAL INFORMATION, ANY QUESTIONS

• Any questions on anything covered?
• Thanks for your attention and interest
Technical Aspects of MassDEP Noise Regulation

Michael Bahtiarian

Principal Consultant

Acentech
Technical Aspects of the MADEP Noise Regulation

Presented By:
Mike Bahtarian, INCE Bd. Cert.
Principal Consultant
March 28, 2018
Introduction & Background

- **Personal:**
  - INCE Board Certified
  - 24 years experience (23.5 years at another firm)
  - Member of “WNTAG” (Wind Turbine Noise Technical Advisory Group)

- **Corporate:**
  - Specializes in
    - Acoustics
    - Noise
    - Vibration
    - AV/IT/Security
  - Offices in Cambridge, Philadelphia & Los Angeles
  - Incorporated in 1991
  - Branch of BBN – (Bolt, Beranek & Newman)
Regulation 310 CMR 7.10: 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.
Noise Reg Quick Read

• Violation occurs if any source of sound:
  – Increases the Broadband SPL* by 10 dB above the Ambient SPL**
  or
  – Produces a Pure Tone***

• Applies at either:
  – Property Line
  and (but should this have been “or”?)
  – Nearest Inhabited Residence
MADEP Definitions

* Broadband SPL is the A-weighted overall sound pressure level.

** Ambient SPL is defined as the background A-weighted sound pressure level that is exceeded 90% of the time measured during equipment operation. The ambient may also be established by other means with the consent of the Department.

** Pure Tone is defined when any octave band center frequency sound pressure level exceeds the two adjacent center frequency sound pressure levels by 3 decibels or more.
How do you measure background noise?

- There is no detailed method from MADEP.
- Consultants have done it many different ways and we held one meeting of the Boston Chapter of ASA on this topic.
- Approaches will depend on noise source and environment.

What do we know from MADEP Fact Sheet:

- Need to measured A-weighted SPL.
- Measure during equipment operating hours.
- Need to measure level that is exceeded 90% of the time.
- Ambient sound may be established by other means.
How do you measure background noise?

**What is not specified:**

- Location of the Sound Level Meter
- Instrumentation Type(s) or Settings
- Noise Metrics
- Duration of Survey
- Sampling Periods
- Compilation of Data Sets
How do I measure background noise?

• Instrumentation: **Type 1 Logging Sound Level Meter**

• Noise Metrics: **$L_{EQ}, L_{90}, L_{10}$ (sometimes others)**

• Time of Day for Measurement**:
  – Daytime (7am to 7pm)
  – Evening (7pm to 10pm)
  – Nighttime (10pm to 7am)

• Duration of Measurement
  – 20 minutes
  – 2 to 3 hours
  – 3 to 4 days
  – 1 week

• Sampling Period: **1 hour** (but sometimes 5 minutes)

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*These time periods were originally defined in the EPA “Levels Document” (1974) and more recently in ANSI S12.9-Part 1 (2013).*
My Use of a Reference Location

Graphic from author’s prior work at Noise Control Engineering, LLC PowerPoint Presentation dated June 2011.
How do you compile background noise data?

• No guidance in MADEP Fact Sheet
• Extensive sampling offered by newer SLM’s
• Longer sample periods should be divided
• Single Values:
  – Minimum
  – Average
  – Maximum
• Details could vary depending on situation
Which SPL is Background?

![Graph of Sound Pressure Levels](image)

- **Daytime Average**
- **Nighttime Average**

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MassDEP Noise Policy Implementation – Have You Heard About It?
How do I compile background noise data?

- Compile $L_{90}$ values by time of day
  - Daytime (7am to 7pm)
  - Evening (7pm to 10pm)
  - Nighttime (10pm to 7am)
- Sampling Period of 1 hour or 5 minutes
- Take Arithmetic Average $L_{90}$ for each sample in each daytime period per above
- To be extra conservative, some people take the 90th percentile of each $L_{90}$ data set.
What is a Pure Tone Look Like

Pure Tones at 250 hertz
How is it defined?

>= 3 dB
Other Ways to Measure Pure Tones

One-third Octave Band

Narrowband

Data from Bahtiarian, Michael, “Deficiency of the Massachusetts Pure Tone Noise Regulation”, 2009 Acoustical Society of America Conference, Portland.
CASE STUDY #1: Pure Tone Pitfall

Data from Bahtarian, Michael, “Deficiency of the Massachusetts Pure Tone Noise Regulation”, 2009 Acoustical Society of America Conference, Portland.
CASE STUDY #2: Urban Site

- Urban site under Redevelopment
- Impacted by:
  - Adjacent to transportation hub
  - Airport traffic
  - Busy local street
- Data shows diurnal patterns
CASE STUDY #3: ???

- Urban Site
- 4 days of mentioning, through a weekend
- Graphed dBA & 50 Hz one-third octave band

What Am I?
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Thanks to the EBC for this opportunity speak

MassDEP Noise Policy Implementation – Have You Heard About It?
Open Discussion

Moderator:
• Mike Feinblatt, *ESS Group, Inc.*

Panel Members:
• Daniel Bailey, *Pierce Atwood LLP*
• Joseph Dufresne, *Saint-Gobain Abrasives*
• Michael Bahtiarian, *Acentech*