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August 12, 2014

Commissioner Thomas S. Burack  
Chairman, Site Evaluation Committee  
Department of Environmental Services  
29 Hazen Drive  
Concord, NH 03302

Chairman Amy L. Ignatius  
Vice Chair, Site Evaluation Committee  
Public Utilities Commission  
21 South Fruit Street  
Concord, NH 03301

Dear Chairman Burack and Vice Chair Ignatius:

I am writing to report on work undertaken by the Office of Energy and Planning (OEP) as required by Senate Bill 99 of 2013. As you know, that legislation required OEP to perform two main tasks related to the Site Evaluation Committee (SEC).

The first was a review of the SEC's organization, structure, and processes, which OEP completed on December 31, 2013 with the assistance of Raab Associates and the Consensus Building Institute. The results of this work were compiled into three reports, available on the OEP website:

- A Multi-State Energy Facility Siting Review, available at [http://www.nh.gov/oep/energy/programs/documents/sb99other\\_states\\_process.pdf](http://www.nh.gov/oep/energy/programs/documents/sb99other_states_process.pdf)
- A Review of the New Hampshire Siting Process, available at [http://www.nh.gov/oep/energy/programs/documents/sb99nh\\_siting\\_process.pdf](http://www.nh.gov/oep/energy/programs/documents/sb99nh_siting_process.pdf)
- A Report on Stakeholder and Citizen Feedback on Siting Issues, available at <http://www.nh.gov/oep/energy/programs/documents/sb99reportonstakeholderandcitizenfeedback.pdf>

As you are aware, those reports helped inform discussions of SB 245 of 2014, which made several significant changes to the membership, organization, administration, and funding of the SEC.

The second area of work for OEP was to hold a public stakeholder pre-rulemaking process to help develop regulatory criteria for the siting of energy facilities, to inform an SEC rulemaking process. OEP convened public meetings this Spring, with the assistance of Navigant Consulting and staff from the Public Utilities Commission and the Department of Environmental Services, to discuss issues related to the content of new siting criteria that the SEC is now required to adopt by July 1, 2015. OEP thanks the many citizens and other stakeholders and representatives who devoted significant time to discussing, researching, and drafting potential siting criteria to inform the SEC rulemaking process.

The results of this work are attached, and are also available on OEP's website at <http://www.nh.gov/oep/energy/programs/sb99pre-rulemaking.htm>. There are four working group reports for the SEC's consideration and review as it begins its rulemaking process, covering the following topics:

- Aesthetics
- Orderly Development
- Wildlife, Rare Plants and Natural Communities
- Health and Safety

These documents reflect the work of self-selected working groups of citizens and other stakeholders and representatives, and were led by volunteers who agreed to facilitate the groups and lead the drafting of the group reports. The group participants are listed in each report document. The meetings and the process were open to all who wished to participate. Several citizens who participated objected to the participation of project developers and other industry representatives. OEP also received a request to identify the professional affiliation of those who were participating on behalf of another party. That information is provided in each working group report.

The working group reports include areas of agreement when reached, other issues that members of the groups wished to raise, proposed issues and/or language for inclusion in siting rules, and references to other states' rules or other documents that may be useful in the development of new siting criteria. In some cases, working group members also submitted additional individual comments, which are also attached.

Due to the short time frame, the complexity of the work, and the diversity of views participating in the process, the final documents produced by the working groups do not contain full draft regulatory criteria in many cases. The groups were able to make progress in certain areas, and those recommendations are included. In other areas, however, groups did not reach consensus, and/or did not have sufficient time to develop draft rule language.

In addition, the New Hampshire Preservation Alliance provided comments related to cultural and historical resource issues, and they are also attached. OEP also received other public comments on the pre-rulemaking process, which can be found at the bottom of this webpage: <http://www.nh.gov/oep/energy/programs/sb99pre-rulemaking.htm>. Finally, OEP received copies of documents on a range of topics related to siting issues, including rules from other jurisdictions, research studies, and policy statements. All documents received are also posted on OEP's SB 99 pre-rulemaking webpage.

OEP reiterates its appreciation for everyone who participated in the pre-rulemaking process. These issues are complex, technical, and are often informed by deeply held views. We appreciate the dedication and patience of everyone involved, and we hope that participants will stay engaged as the SEC embarks on its formal rulemaking process in the coming year.

Please do not hesitate to contact me if we can provide any further assistance.

Sincerely,

A handwritten signature in blue ink, appearing to read 'MATH', with a small superscript 'r' to the right.

Meredith A. Hatfield, Director

# **NH OEP SB99 Pre-Rulemaking Process Aesthetics Workgroup Report June 6, 2014**

## **Executive Summary**

The objective of the Aesthetics Workgroup was to develop a set of siting criteria to be considered by the SEC when evaluating the impacts of proposed projects on the aesthetics and scenic and natural beauty of the proposed project area. The proposed siting criteria are intended to be used by Office of Energy Planning and the Site Evaluation Committee in formulating rules as required by SB99.

Attached to this summary are the “Draft Siting Criteria for Aesthetics” which contains the results of our group’s efforts and should be read jointly with this document. The intent of the effort was to 1) establish criteria for the content of an application to the SEC which would provide sufficient information to allow SEC members to make an informed and judicious decision on whether to approve or reject an application, and 2) provide additional guidance regarding the determination of whether a project would create an “unreasonable adverse effect” on aesthetics. **It is important to recognize that these draft criteria do not represent the consensus of the group, but are the most recent version of a “strawman” document that formed a basis for group discussion. Areas of agreement and disagreement are discussed later in this report.**

The Aesthetics Workgroup was made up of a very diverse group of members. Of the 21 members, 9 represented various segments of the energy industry or industry supporters and 12 represented the general public, industry opponents or non-governmental organizations. In general, the perspective of the industry members was to keep the siting criteria and rules as general and subjective as possible while the public members leaned towards making the criteria and rules much more detailed and comprehensive. It was the strong view of several of the “public” members that industry representatives should not have been allowed to participate in the rulemaking process as their motives and objectives were not in the public interest but served the interests of private commercial enterprises. In the following discussions, where we attribute positions to “industry representatives” and “public members” these positions generally reflect those groups but may not be universally accepted by all members of that group.

General agreement was reached by the group that some level of Visual Impact Analysis (VIA) should be required for all proposed facilities and the rules should allow flexibility in the level of VIA based on the type and level of impact. As noted in the next section, there was agreement, as noted in the attached aesthetics siting document about many of the general requirements for the VIA and the general approach for a detailed VIA.

Due to the diverse makeup of the workgroup, there were many areas of disagreement. As a result of the widely disparate perspectives, it was difficult to reach agreement on many of the topics that were discussed. In our siting document, we have tried to represent the positions of both of these groups. Some areas of disagreement included whether the visual impact assessment should include private property such as single residences or concentrated residential

developments; whether and how local views (i.e. master plans, zoning, etc.) should be included in the decision-making process or what weight, if any, should be given to town votes; should photo-simulations of nighttime lighting of representative photographs of other similar projects be required; and whether to include a requirement for radar-activated aircraft warning lighting.

We elected not to decide any issues by taking a vote since the results would undoubtedly simply indicate the make-up of the group, which was skewed towards the public viewpoints. Alternatively, we decided to seek consensus on as many points as we could and to represent in the siting document the viewpoints of all sides on an issue, rather than only present the opinions of the majority.

Many in the “public sector” of the workgroup felt that the enabling legislation needed to be amended as discussed in Topic G, Section 7.0.

## **Work Summary by Topic**

The following topics will be summarized:

Topic A – Visual Impact Assessment – Level of Detail  
Topic B – Definition of Extent of the Visual Analysis Zone  
Topic C – Views from Private (Residential) Properties  
Topic D – Local Master Plans, Zoning & Town Votes  
Topic E – Impacts from Nighttime Lighting  
Topic F – Definition of Unreasonable Adverse Effect  
Topic G – Need for Further Legislative Actions

Please refer to the attached “Draft Siting Criteria for Aesthetics” for more detailed information.

### **1.0 Key Findings, Topic A – Visual Impact Analysis (VIA)**

The contents and requirements for a Visual impact Analysis that would be required for all proposed energy facilities under the jurisdiction of the SEC are specified in the “Application Requirements” section of the attached draft siting document.

#### **1.1 Areas of Agreement**

Some level of Visual Impact Analysis (VIA) should be required for all proposed facilities. The rules should allow flexibility in the level of VIA based on type of facility and level of impact and the general requirements for all VIAs should include:

- Description of facility.
- Characterization of aesthetic landscape.
- Characterization of extent of visibility and aesthetic impacts of project.
- Description of alternatives considered.
- Description of mitigation.

- More detailed VIA requirements should be specified for wind power facilities and large transmission lines.

The general approach for detailed VIAs should include:

- Define visual analysis zone.
- Delineate visible area within visual analysis zone (both bare ground and w/ vegetative screening).
- Identify sensitive viewpoints/viewsheds from which facility will be visible.
- Assess impact of facility to the aesthetics of sensitive viewpoints/viewsheds.
- Prepare simulations of facility from selected viewpoints.

The assessment of impacts to sensitive viewpoints should include some level of characterization (e.g. Low, Medium, and High as is done in Maine) as a starting point for identifying aesthetic impacts of greatest concern.

Specific standards for the development of photosimulations should be developed.

## 1.2 Areas Without Agreement

Most industry representatives are of the opinion that past VIAs have been complete and acceptable to the SEC and the SEC has the authority to require additional information, if it needs it to make a decision. It is their opinion that the process has been working acceptably and should not be changed. Most, if not all, public representatives disagreed.

The definition of “large transmission line” for purposes of detailed VIA requirements needs to be resolved. These should not necessarily include all transmission lines under SEC jurisdiction.

The delineation of the visual analysis zone for large transmission lines needs to be defined. It has been suggested that for private/public areas, the viewshed for the White Mountains National Forest and other protected lands should be three miles for transmission lines.

Incorporation of cumulative effects is dependent on passage of SB281<sup>1</sup> and how or whether they are addressed therein.

Existing development should include facilities for which a certificate has been granted, but which are not yet constructed or operational. Some public members wanted projects that have undergone significant planning and definition (such as Northern Pass and the Wild Meadows Wind Project) but have not yet been filed with the SEC to be considered in the SEC deliberations.

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<sup>1</sup> Subsequent to the final edits of this document, it was learned that SB281 (attached to HB1602) passed both the House and Senate on June 4, 2014 and states that under RSA 162-H:10-a, Wind Energy Systems, the SEC shall address “Cumulative impacts to natural, scenic, recreational, and cultural resources from multiple towers or projects, or both.”

SEC members should be required to visit the project area to view the landscape and determine the suitability of the visual impact zone used in the Visual Impact Analysis and to examine the significant scenic viewpoints.

The siting criteria must not exceed the authority granted by the statute.

How (or even whether) the criteria should provide greater definition as to what constitutes an “unreasonable adverse effect”. Several industry representatives have stated that the SEC has experience dealing with making determinations and new standards and criteria are not needed. Most, if not all, public representatives disagreed.

### 1.3 Alternative Proposals For Areas Without Agreement

The SEC could require an independent peer review of the VIA through the Counsel for the Public.

It was also suggested that the VIA be prepared by an independent consultant engaged by the SEC at the expense of the Applicant.

Establish a process within an existing state agency that would have the expertise and authority to determine, based on each project’s particular characteristics, what the scope of the Visual Impact Assessment would be for that project. This could be established early in the planning process (before studies are conducted and an application filed with the SEC) so that the planning work by the project proponent can be defined, as part of a public process, before significant effort and cost is expended.

Utilize the approach specified in Vermont’s “Quechee test” (and reflected with modifications in the Jean Vissering document *A Visual Impact Assessment Process for Wind Energy Projects*, page 27) as a basis for better defining an unreasonable adverse effect.

Proposed standards for the preparation of visual simulations include<sup>2</sup>:

- Photographs used in the simulation shall be taken at an equivalent focal length of 50 mm (i.e., “normal view”).
- Simulations should represent the equivalent of what would be taken with a 75mm focal length lens on a full-frame 35mm camera and printed at 15.3"x10.2" (390x260mm) for hand-holding.

### 1.4 Other General Comments

Due to time and resource constraints, our workgroup was not able to investigate what is done in this area in other states. It would make sense to investigate the criteria used by other jurisdictions, although it must be recognized that the visual impacts in northern New England are quite different from most other regions of the country.

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<sup>2</sup> Suggested standards for the preparation of simulations (*Visualization Standards for Wind Energy Developments*) have been developed by The Highland Council (UK).

A consultant should be hired to review the requirements being used by other states, primarily ME, MA, VT, RI, CT and NY ( the NE Grid states ), review the current literature, and review any National and International standards (such as, for instance, the ISO requirements on acceptable noise levels ) and put together a strawman for final rulemaking.

## **2.0 Key Findings on Topic B - Definition of Extent of the Visual Analysis Zone**

[Language from draft criteria – App. C.1] The VIA shall analyze aesthetic impacts within a “visual analysis zone” defined as follows:

- a) For wind energy projects: at least 10 miles from any turbine.
- b) For electrical transmission lines: no specified distance, but shall be sufficient to allow identification and analysis of potentially sensitive viewpoints from which it will be clearly visible. Suggested distances are ½ mile in urban areas, 2 miles in suburban and rural residential and village areas, 5 miles in lightly developed or undeveloped landscapes where the line follows an existing corridor, and 10 miles where the line would be located in a new corridor.

### **2.1 Areas of Agreement**

There is agreement that a visual analysis zone should be defined, and that 10 miles is an appropriate minimum distance for wind power projects.

### **2.2 Areas Without Agreement**

There is significant disagreement on the boundaries of the visual impact zone. Industry representatives generally want the zone to be fixed and smaller. Public members want it to be larger and related to the specific project characteristics. Other public members even want the zone to be the entire viewshed, which could extend well beyond the distances specified above. Public members generally favor at a minimum giving the SEC the authority to consider impacts to particularly sensitive viewpoints beyond these distances.

The delineation of the visual analysis zone for large transmission lines needs to be defined.

### **2.3 Alternative Proposals For Areas Without Agreement**

The suggested distances from electrical transmission lines require broader discussion.

Establish a process within an existing state agency that would have the expertise and authority to determine, based on each project’s particular characteristics, what the limits of the visual impact zone would be for that project. This could be established early in the planning process (before studies are conducted and an application filed with the SEC) so that the planning work by the project proponent can be defined, as part of a public process, before significant effort and cost is expended.



## 2.4 Other General Comments

Due to time and resource constraints, our workgroup was not able to investigate what is done in this area in other states. It would make sense to investigate the criteria used by other jurisdictions, although it must be recognized that the visual impacts in northern New England are quite different from most other regions of the country.

A consultant should be hired to review the requirements being used by other states, primarily ME, MA, VT, RI, CT and NY ( the NE Grid states ), review the current literature, and review any National and International standards (such as, for instance, the ISO requirements on acceptable noise levels ) and put together a strawman for final rulemaking.

## **3.0 Key Findings on Topic C - Views from Private (Residential) Properties**

[Language from draft criteria – App. C.1] The VIA shall identify visually sensitive viewpoints within the visible area, which may include (but are not limited to) Scenic Viewpoints, town or village centers, major public roads, cultural areas or facilities, major water bodies or rivers, and residential areas.

### 3.1 Areas of Agreement

There is agreement that all public visually sensitive viewpoints should be included.

### 3.2 Areas Without Agreement

There is a split between the industry representatives and the public members on the inclusion of private (residential) properties. The industry representatives do not want to include private viewpoints; the public members want to include them. Some public members suggest including viewpoints from concentrated residential developments; others want to include even individual homes with a significant view of the project.

The evaluation of impacts on residential areas should not disadvantage or discriminate against rural areas with low residential density.

### 3.3 Alternative Proposals For Areas Without Agreement

Establish a process within an existing state agency that would have the expertise and authority to determine, based on each project's particular characteristics, what limited number of private viewpoints, if any, should be included in impact evaluation.

### 3.4 Other General Comments

If viewpoints from private properties are to be included, they must be “typical” and potentially significant.

## **4.0 Key Findings on Topic D - Local Master Plans, Zoning & Town Votes**

To the extent permitted by existing legislation, many members of the public felt that SEC decisions should not trump or preempt local wishes as expressed in master plans, zoning or town votes and that town votes should be definitive. (This is mentioned further in Section 7.0 as legislative changes would be required.) Towns and citizens must have adequate notification of and information about projects. Lots of concern about citizen's ability to participate in the process – intervention can be expensive and time-consuming.

#### 4.1 Areas of Agreement

Local, regional and state master plans, local zoning and town votes should be considered by the SEC.

#### 4.2 Areas Without Agreement

Industry representatives are comfortable with the current rules whereby the SEC “considers” such factors but is not bound by them. Public members generally feel that existing legislation should be revised to state that local master plans, rights-based-ordinances, zoning and town wide votes should govern what the SEC does and no project should be approved without local support.

#### 4.3 Alternative Proposals For Areas Without Agreement

Local, regional and state master plans, local zoning and town votes should be presented and discussed in the application to the SEC. If legislation is not enacted to address these issues, the SEC should consider the full intent of the local actions and the strength of the wording and/or the number of communities (host and neighboring) and representation of the local townwide votes in their evaluation.

#### 4.4 Other General Comments

The positions of and impacts to both host and non-host communities within the visual impact zone should be included in the evaluation and consideration by the SEC. Many in the workgroup expressed confusion and frustration about the methods of participation in the SEC process. Counsel for the Public should focus efforts and resources on helping concerned parties more effectively participate in the process.

### **5.0 Key Findings on Topic E – Impacts from Nighttime Lighting**

#### 5.1 Areas of Agreement

Impacts from nighttime lighting should be addressed by the applicant and considered by the SEC. The impact of nighttime lighting should be characterized (how many lights would be seen from different viewpoints, etc.).

#### 5.2 Areas Without Agreement

Public members want inclusions of photo-simulations of nighttime lighting or representative photographs of other similar projects. These concepts are generally supported by non-industry representatives. These concepts are opposed by at least some industry representatives, in part or in whole based on expert testimony indicating that current techniques are not capable of properly rendering nighttime lighting simulations.

There was disagreement as to whether a specific requirement for the use of radar-activated aircraft warning lighting once approved by FAA (including post-construction retrofitting) should be included. This was generally supported by public representatives and opposed by at least some industry representatives.

There is also a question of whether the evaluation of nighttime lighting should extend beyond the visual impact zone of the daylight VIA, since the red lights can be seen from a greater distance.

### 5.3 Alternative Proposals For Areas Without Agreement

[Language from draft criteria – App. C.1] If the facility is required by Federal Aviation Administration regulations to install aircraft warning lighting, then, if the facility is in a developed area or an area of scenic resources, the facility shall utilize radar-activated lighting unless technically or economically infeasible. If such technology has not been approved for use by the FAA at the time the certificate has been granted, then as a condition of the certificate the project will be required to install radar-activated lighting within a reasonably short time period of FAA approval of such technology. SEC members should be urged to visit similar projects at night to see first-hand the impacts of nighttime lighting.

### 5.4 Other General Comments

The visual impacts of nighttime lighting can be as significant as or greater than those during the daylight. Some way to accurately represent these impacts must be included in the application to the SEC.

A consultant should be hired to review the requirements being used by other states, primarily ME, MA, VT, RI, CT and NY ( the NE Grid states ), review the current literature, and review any National and International standards (such as, for instance, the ISO requirements on acceptable noise levels ) and put together a strawman for final rulemaking.

## **6.0 Key Findings on Topic F – Definition of Unreasonable Adverse Effect**

There needs to be a better definition of (or criteria for) what constitutes an “unreasonable adverse effect” on aesthetics. An approach has been suggested that, to the extent it is consistent with NH law, is based on the three-part “Quechee Test” used in Vermont and incorporated in guidance for that state’s Act 250 rules:

- Does the Project violate a clear, written community standard intended to preserve the aesthetics or scenic beauty of the area?

- Does the Project offend the sensibilities of the average person? Is it offensive or shocking because it is out of character with its surroundings or significantly diminishes the scenic qualities of the area?
- Has the Applicant failed to take generally available mitigating steps which a reasonable person would take to improve the harmony of the Project with its surroundings?

This approach is also reflected with different wording in the Vissering/CESA document on the OEP web site (A Visual Impact Assessment Process for Wind Energy Projects, page 27):

- Does the project violate a clear written standard intended to protect the scenic values or aesthetics of the area or a particular scenic resource?
- Does the project dominate views from highly sensitive viewing areas or within the study area as a whole?
- Has the developer failed to take reasonable measures to mitigate significant or avoidable impacts of the project?

#### 6.1 Areas of Agreement

There is strong (but not unanimous) support for an approach based on the three-part “Quechee test”. Some believe that the “Vissering/CESA” approach is a better approach than the Quechee test.

#### 6.2 Areas Without Agreement

Some of the industry representatives are of the opinion that the term “unreasonable adverse effect” does not need to be defined and the determination can continue to be left solely to the SEC.

#### 6.3 Alternative Proposals For Areas Without Agreement

Perhaps, an “Aesthetic Impact Panel” made up of a cross section of residents, users of the scenic viewpoints, and independent consultants could be designated by an existing state agency (suggested under previous topics) to evaluate the visual impacts and make a determination of whether the visual impacts are “unreasonable”.

#### 6.4 Other General Comments

A consultant should be hired to review the requirements being used by other states, primarily ME, MA, VT, RI, CT and NY ( the NE Grid states ), review the current literature, and review any National and International standards ( such as, for instance, the ISO requirements on acceptable noise levels ) and put together a strawman for final rulemaking.

### **7.0 Key Findings on Topic G – Need for Further Legislative Actions**

Legislative changes may be needed to:

- Require the SEC to visit the project area.

- Require the SEC to visit a comparable project at night to view the impacts of the nighttime lighting.
- Have approval of the project by the SEC be subject to local master plans, zoning and town wide votes.
- Require the applicant to give early and adequate notification of and information about project to the towns within the visual impact zone.
- Consider cumulative effects of multiple projects and multiple impact areas.
- Give towns and residents within the visual impact zone the ability to participate in the process early in the planning phase.
- Require the SEC to make a distinction between essential and non-essential projects and, if a project is non-essential, it shall not preempt town zoning and regulations.
- Modify, if necessary, the “Quechee Test” to be consistent with NH Law, if this approach is preferred to the Vissering/CESA approach.
- The SEC shall have representation of residents, with voting rights, from the affected towns.

A few of these issues are included to one degree or another in pending legislation (SB245 and SB281<sup>3</sup>).

#### 7.1 Areas of Agreement

Several of the topics discussed during the workgroup process may be beyond the scope of current law and may require further legislative action.

#### 7.2 Areas Without Agreement

Most industry representatives are of the opinion that legislative changes are not needed and that the process has worked well. Many of the workgroup members may not have the expertise to determine which topics or recommendations, if any, are beyond the scope of RSA 162 and SB-99. This determination will be left to the SEC.

Inclusion of cumulative impacts from pending development of multiple projects, and whether it should include projects in earlier stages (such as for which an application has been accepted by the SEC, or even which are in an earlier stage of development but which are sufficiently well defined for potential impacts to be known), is the subject of continuing discussion.

#### 7.3 Alternative Proposals For Areas Without Agreement

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<sup>3</sup> Subsequent to the final edits of this document, it was learned that SB281 (attached to HB1602) passed both the House and Senate on June 4, 2014 and states that under RSA 162-H:10-a, Wind Energy Systems, the SEC shall address, among other things: “Visual impacts as evaluated through a visual impact assessment prepared in accordance with professional standards by an expert in the field”; “Cumulative impacts to natural, scenic, recreational, and cultural resources from multiple towers or projects, or both”; and “Best practical measures to avoid, minimize, or mitigate adverse effects”.

Legal counsel to the SEC should make a determination as to whether and to what extent the action items listed in Section 7.0 are within the context of the existing statute or would require further legislative action.

#### 7.4 Other General Comments

To the extent that further legislative actions are needed, legislators monitoring this rulemaking process could propose such legislation.

### **References**

Vermont Natural Resources Board. 2013. District Commission Training Manual, Part B: Act 250 Criteria, Section 16: Criterion 8 (Aesthetics, scenic and natural beauty).

Vissering, Jean. 2011. A Visual Impact Assessment Process for Wind Energy Projects. Clean Energy States Alliance.

## Appendix A: Group Members

### SB-99 AESTHETICS WORKGROUP MEMBERS

NAME	ROLE	TITLE	AFFILIATION	REPRESENTING
David Publicover	Co-leader	Senior Staff Scientist	Appalachian Mountain Club	Non-Governmental Organization
Peter Silbermann	Co-leader	Environmental Engineer	Bridgewater Resident	Public
Marc Brown	Member	Executive Director	New England Ratepayers Assoc.	Non-Governmental Organization
Art Cote	Member	Fire Protection Engineer	Plymouth Resident	Public
Terry DeWan	Member	Landscape Architect	Terrance J. DeWan & Assoc.	Energy Developer Consultant
Susan Geiger	Member	Attorney	Orr & Reno	Wind Developer
Jack Kenworthy	Member	CEO	Eolian Renewable Energy	Wind Developer
Mary Lee	Member		Northfield Resident	Public
Lisa Linowes	Member	Executive Director	WindAction.org	Non-Governmental Organization
Dorothy McPhaul	Member		Sugar Hill Resident	Public
LeeAnn Moulder	Member		Holderness Resident	Public
Tom Mullen	Member	Master Developer	Owl's Nest Resort, Campton	Public
Barry Needleman	Member	Attorney/Partner	McLane, Graf, Raulerson & Middleton	Energy Developer Representative
Mike Novello	Member	Renewable Energy Analyst	Wagner Forest Management	Land Owner - Wind Industry
Kris Pastoriza	Member		Easton Resident	Public
Bob Piehler	Member		Alexandria Resident	Public
Mark Rielly	Member	Attorney	National Grid	Industry Representative
Derek Rieman	Member	Project Developer	EDP Renewables	Wind Industry Representative
Stuart Smith	Member	Project Developer	Grafton Energy Group	Industry Representative
Jenny Tuthill	Member		Alexandria Resident	Public
Bob Tuveson	Member		Holderness Resident	Public

## **Appendix B: Group Meeting/Conference Call Dates & Notes**

### April 28, 2014: Telephone conference call. 15 members participated

The initial conference call of the Aesthetics Workgroup dealt with a discussion of a “Draft Siting Criteria for Aesthetics” dated April 24, 2014 which had previously been circulated by e-mail to the workgroup members. Several persons on the call had not been on the original distribution list and were e-mailed copies of the draft as the meeting was on-going. After introductions of those on the call, there was a discussion of the draft led by David Publicover. Comments from several on the call had been received and were included in the discussion. Several others on the call indicated that they would submit written comments after the call. There was discussion about the definitions included in the draft and it was stated that the definition of scenic viewpoints was too broad, especially the mention of “Great Ponds” of which there are over 700 in the state. Industry representatives generally felt that past VIAs were adequate and additional definition and siting criteria were unnecessary. Some time was spent discussing the meaning of “aesthetically pleasing or displeasing”. There was also discussion about whether to include views from private property in the assessment. The discussion then moved to the “Application Requirements” section of the draft and there was discussion about each item in the draft. Most of the discussion centered on the terms “significant visual impact” and the boundary of the visual impact zone. There was also discussion about the need for a pre-application hearing and the need for nighttime simulations. Finally, there was discussion about the “Siting Criteria” section. Most industry representatives felt that the existing statute was clear and the SEC process has been working fine. The public members want more details and specificity in the rules. This initial call centered on identifying the respective positions of the members and identifying areas requiring more discussion. David inserted notes and comments on his version of the draft as comments were made with the objective of incorporating the various points of view into the next draft. The call lasted about 1 hour and 30 minutes.

### May 6, 2014: Second telephone conference call. 12 members participated

Subsequent to the initial conference call, many additional comments were received via e-mail, memoranda and letters. On this second conference call, the group dealt with further discussions

On May 5<sup>th</sup>, a version of the draft siting criteria was circulated into which all of the written comments received after the 5/28 call were inserted. On this date, a set of “discussion questions” were distributed to the workgroup in preparation for the 5/6 conference call. Many comments and responses were received.

The second conference call dealt primarily with whether viewpoints from private property should be included and the level of detail to be included in a Visual Impact Analysis. It was generally agreed that the group should proceed with developing siting criteria for a detailed VIA and let the SEC scale it back if they choose to do so. The call lasted for about 1 hour and 45 minutes.

### May 14, 2014: Telephone conference call. 10 members participated



The responses to the 5/6 discussion question survey, along with an updated 5/9 version of the “Draft Siting Criteria for Aesthetics”, were distributed in preparation for the May 14<sup>th</sup> conference call. The conference call dealt reviewing and discussing the responses received to the survey questions and summarizing that changes incorporated into the draft siting document. There was a lengthy discussion about the contents of a VIA, the visual impact area delineation, inclusion of private viewpoints, the need for SEC visits to the project area, nighttime impacts and how best to address them, and what criteria might be beyond the scope of the existing statute governing the SEC. There was strong, but not unanimous, agreement by the group that visual impacts should be categorized as low, medium or high.

There was also a discussion about whether the SEC should be “required” to visit a wind project site at nighttime to see the impacts of the lights. The group felt that the nighttime impacts needed to be studied and included in the application.

Finally, the meeting discussed the need to develop siting criteria for transmission lines and to agree on a definition for “unreasonable adverse visual impacts” as were addressed by Vermont’s “Quechee Test”.

#### Other Communications

In addition to these telephone conference calls, there was a continuous flow of information and draft documents among the workgroup members. A total of 5 drafts were developed, each containing edits, revisions and comments. Input through survey questions, e-mail exchanges, and memoranda was provided by most members of the group.

## **Appendix C: Relevant Documents and Materials**

C-1: SB99 Pre-rulemaking – Aesthetics Criteria Working Group, Draft Siting Criteria for Aesthetics, May 22, 2014.

(Subsequent to the final edits of this document, it was learned that SB281 (attached to HB1602) passed both the House and Senate on June 4, 2014 and states that under RSA 162-H:10-a, Wind Energy Systems, the SEC shall address, among other things: “Visual impacts as evaluated through a visual impact assessment prepared in accordance with professional standards by an expert in the field”; “Cumulative impacts to natural, scenic, recreational, and cultural resources from multiple towers or projects, or both”; and “Best practical measures to avoid, minimize, or mitigate adverse effects”).

APPENDIX C.1  
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FOR DISCUSSION PURPOSES ONLY

Notes

- 1) This document is the last iteration of a “strawman” document that formed the basis for working group discussions. **It does not represent a consensus recommendation of the group.** While there is broad agreement on many of the concepts in this document, there are also significant areas of disagreement regarding both concepts and specific language. Areas of agreement and disagreement are discussed in detail in the working group report.
- 2) Unless otherwise specified, these criteria are intended to be applicable to all energy facilities under the jurisdiction of the Site Evaluation Committee (the “Committee”), though they are most applicable to facilities having impact over broad areas (such as wind energy facilities and transmission lines).

**Draft Siting Criteria for Aesthetics  
FOR DISCUSSION PURPOSES ONLY  
May 22, 2014**

**Definitions<sup>4</sup>**

1. “Best practical mitigation”<sup>5</sup> means methods or technologies used during siting, design, construction or operation of an energy development that control or reduce to the lowest feasible level impacts to aesthetics, historic sites, air and water quality, the natural environment, and public health and safety, with consideration given to:
  - The existing state of technology;
  - The effectiveness of available technologies or methods for reducing impacts; and
  - The economic feasibility of the type of mitigation under consideration,
2. “Cumulative effect”<sup>6</sup> means the incremental adverse effect of an energy facility on the resource values set forth in NH RSA 162-H:16, IV(c) when added to other existing<sup>7</sup> [and pending?] development. Cumulative effects can result from individually minor but collectively significant developments taking place over a period of time. The Committee may

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<sup>4</sup> Additional terms will be defined once we know what terms within these proposed criteria need definition.

<sup>5</sup> This definition is adapted from one enacted into law in Maine in 2013.

<sup>6</sup> Subsequent to the final edits of this document, it was learned that SB281 (attached to HB1602) passed both the House and Senate on June 4, 2014 and states that under RSA 162-H:10-a, Wind Energy Systems, the SEC shall address, among other things, “Cumulative impacts to natural, scenic, recreational, and cultural resources from multiple towers or projects, or both”.

<sup>7</sup> Existing development should include facilities for which a certificate has been granted, but which are not yet constructed or operational.

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analyze cumulative impacts with reference to guidance established under the National Environmental Policy Act, as amended, to the extent consistent with this definition<sup>8</sup>.

3. “Pending development”<sup>9</sup> means any energy facilities for which an application for a certificate has been filed with and determined complete by the Site Evaluation Committee.
4. “Scenic Viewpoint” means any point to which the public has a legal right of access and which provides a focal point for aesthetic enjoyment of the surrounding landscape. Scenic Viewpoints are not intended to encompass all points affording views of a facility, but rather those points or routes from which aesthetic enjoyment is a significant component of the user experience. Scenic Viewpoints may<sup>10</sup> include viewpoints from: (a) a National Natural Landmark, federally designated wilderness area or other comparable outstanding natural or cultural feature such as the Appalachian National Scenic Trail; (b) trails or public recreational use areas on federal, state or municipal conservation and/or recreation lands; (c) trails or public recreational use areas on privately-owned conservation lands; (d) trails or public recreational use areas on lands encumbered by a conservation easement in which aesthetic or recreational values are expressly recognized; (e) recreational trails established, protected or maintained in whole or in part with public funds; (f) segments of a National Wild and Scenic River or river designated in the New Hampshire Rivers Management and Protection Program; (g) designated scenic byways; (h) designated scenic turnouts on public roads; (i) a property that is listed on the state or national register of historic places; (j) municipal public recreation areas; (k) viewpoints or viewsheds recognized in municipal master plans; and (l) any other viewpoint which by the weight of evidence meets the spirit and intent of this definition.

“Significant visual impact”<sup>11</sup> means a change in aesthetics and visual resources which occur when features are altered, introduced, made less visible, or are removed, such that the

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<sup>8</sup> Whether it is appropriate to include this has been questioned. The word “may” is used to indicate that these documents can provide guidance but are not intended to establish regulatory requirements. The committee may also consult federal guidance documents regarding the analysis of cumulative impacts, including but not limited to those prepared by the Council on Environmental Quality (see [http://energy.gov/sites/prod/files/nepapub/nepa\\_documents/RedDont/G-CEQ-ConsidCumulEffects.pdf](http://energy.gov/sites/prod/files/nepapub/nepa_documents/RedDont/G-CEQ-ConsidCumulEffects.pdf)) and the Environmental Protection Agency (see <http://www.epa.gov/compliance/resources/policies/nepa/cumulative.pdf>).

<sup>9</sup> Inclusion of pending development, and whether it should include projects in earlier stages (such as for which an application has been accepted by the SEC, or even which are in an earlier stage of development but which are sufficiently well defined for potential impacts to be known), is the subject of continuing discussion.

<sup>10</sup> The word “may” has been added to indicate that it is not required that every viewpoint within these categories be included. It will be up to the preparer of the VIA to determine what should be included, though intervenors and the public may certainly bring up other viewpoints that should be considered.

<sup>11</sup> This definition is intended to use language that is generally well understood in visual analysis methodology to indicate what constitutes a “major” visual impact. It is not equivalent to “unreasonable adverse effect”, but should be used in combination with Siting Criteria #1 to better define what constitutes an unreasonable effect. A significant visual impact on a viewpoint or viewshed or low scenic value or sensitivity may not be considered unreasonable.

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resultant effect on views is strongly incongruous with the inherent, established harmony and character of the landscape, and which demonstrably appear prominent, inharmonious, out of place, discordant, and distracting.

### **Application Requirements**

1. All applicants for a certificate shall prepare a Visual Impact Analysis (VIA) using generally accepted professional standards<sup>12</sup>. The VIA shall be of sufficient detail and geographic scope to allow the Committee and the public to understand and evaluate the potential impact of the proposed facility on the aesthetic character of viewpoints from which it will be clearly visible.
2. The VIA shall include a detailed project description and map, including the size, location and appearance of all facility structures, infrastructure and areas to be cleared or graded.
3. The VIA shall include a description of the physiographic and cultural landscape that forms the visual setting for the facility.
4. The VIA shall characterize the extent of visibility and aesthetic impacts of the facility
5. The VIA shall include a description and discussion of alternatives that were considered during project development.
6. The VIA shall include a description and discussion of any measures taken to avoid, minimize or mitigate adverse aesthetic impacts of the facility.
7. The following provisions<sup>13</sup> in this section shall be required elements of the VIA for 1) wind energy facilities, 2) an electric transmission line of a design rating in excess of 100 kilovolts that is in excess of 10 miles in length. Other facilities shall incorporate these provisions to the extent appropriate and necessary to allow a full evaluation of the potential adverse aesthetic impacts of the proposed facility.
8. The VIA shall analyze aesthetic impacts within a “visual analysis zone” defined as follows:

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<sup>12</sup> Subsequent to the final edits of this document, it was learned that SB281 (attached to HB1602) passed both the House and Senate on June 4, 2014 and states that under RSA 162-H:10-a, Wind Energy Systems, the SEC shall address, among other things: “Visual impacts as evaluated through a visual impact assessment prepared in accordance with professional standards by an expert in the field”.

<sup>13</sup> This provision is designed strike a middle ground between specifying nothing other than a VIA is required, and providing details for all different types of projects (which is both impractical and unnecessary). It focuses on the types of facilities (wind power and large transmission lines) which were the impetus for SB99.

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- c) For wind energy projects: at least 10 miles from any turbine.
  - d) For electrical transmission lines: no specified distance, but shall be sufficient to allow identification and analysis of potentially sensitive viewpoints from which it will be clearly visible. Suggested distances are ½ mile in urban areas, 2 miles in suburban and rural residential and village areas, 5 miles in lightly developed or undeveloped landscapes where the line follows an existing corridor, and 10 miles where the line would be located in a new corridor.<sup>14</sup>
9. The VIA shall include a general description and map of the visual analysis zone, including topography, major landforms and natural features, major conservation lands and recreational areas, public roads, town and village centers, and land cover (e.g. forest, open, agriculture, residential, developed, etc.).
10. The VIA shall identify all parts of the landscape within the visual analysis zone from which any part of any turbine or transmission tower will be potentially visible (the “visible area”), based on both bare ground conditions (i.e. topographic screening only) and with consideration of screening by vegetation or other factors. The analysis shall utilize the highest resolution topographic data available, with a horizontal resolution (raster pixel size) of no more than 30 meters. Analysis of vegetative screening shall assume a height of 40 feet for forest vegetation unless a different height is supported by site-specific data. The analysis shall quantify the extent of project visibility (e.g., number of turbines or towers).
11. The VIA shall identify visually sensitive viewpoints within the visible area, which may include (but are not limited to) Scenic Viewpoints, town or village centers, major public roads, cultural areas or facilities, major water bodies or rivers, and residential areas<sup>15</sup>. Identification of visually sensitive viewpoints shall consider:
- a) The significance of the viewpoint, based on factors such as:
    - The level of use.
    - The uniqueness of the viewpoint relative to other viewpoints in the region.
    - Characterization of the viewpoint in public land management plans, town master plans or other public documents.
    - Identification of the viewpoint in guidebooks or other published materials.
  - b) The existing aesthetic quality of the viewshed seen from the viewpoint, based on factors such as:
    - The horizontal breadth of the viewshed (i.e. panoramic or narrow).

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<sup>14</sup> This is suggested as a starting point for discussion.

<sup>15</sup> The Antrim VIA included consideration of larger residential areas, and the SEC decision document included consideration of “privately owned” areas. They were not included in the Groton VIA or SEC decision.

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- The visual diversity of the viewshed, including topographic and vegetative diversity and the presence of distinctive features such as prominent summits, lakes or rivers.
  - The nature and extent of existing human land use and development.
  - The intactness of the viewshed (i.e., the presence or absence of discordant or distracting elements).
  - The uniqueness of the viewshed relative to other scenic resources in the region.
12. Scenic Viewpoints of particularly high public value, and from which the facility would be clearly visible, beyond the extent of the visual analysis zone shall be considered for inclusion as visually sensitive viewpoints.
13. For all visually sensitive viewpoints identified in Sections 10 and 11, the VIA shall categorize the potential aesthetic impact as Low, Medium or High<sup>16</sup> based on consideration of factors such as:
- The expectations of the typical viewer.
  - The effect on future use and enjoyment of the viewpoint.
  - The extent of facility (including all structures and disturbed areas) visible from the viewpoint.
  - The distance of the facility from the viewpoint.
  - The horizontal breadth (visual arc) of visible facility elements.
  - The scale of the facility relative to surrounding topography and existing structures.
  - The duration and direction of the typical view.
  - The presence of intervening topography.
  - The effect of facility lighting on nighttime use and enjoyment of the viewpoint.
  - The cumulative impact of the facility in combination with other existing [and proposed?] energy facilities.
14. The VIA shall include visual simulations of the facility as follows:
- a) Simulations will be prepared from all visually sensitive viewpoints deemed by the analysis of Section 12 to have a High level of potential impact, as well as a representative sample of views of characteristic landscapes from other visually sensitive viewpoints, public roads, town and village centers, or residential areas.
  - b) Simulations shall include comparative photographs of both the current condition and the simulated appearance of the facility.
  - c) Simulations should include all visible facility structures as well as associated infrastructure (including but not limited to roads) and cleared or graded areas.

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<sup>16</sup> This is a common practice for wind project VIAs in Maine.

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- d) Simulations shall adhere to the following standards [to be developed]:.
  - e) Simulations shall to the greatest practical extent represent conditions of maximum visibility of the facility based on atmospheric conditions, sun angle and other relevant factors.
15. If the facility is required by Federal Aviation Administration regulations to install aircraft warning lighting, then the VIA shall characterize to the greatest practical extent the impact of this lighting (including but not limited to the number of lights visible from different viewpoints).
16. The Committee may require the applicant to conduct a “balloon test” to assist with on-site assessment of facility visibility.

**Siting Criteria**

1. In making a determination as to whether the facility creates an unacceptable adverse effect on aesthetics, the SEC shall consider<sup>17</sup>:
  - a) Would the facility violate a clear, written community standard intended to preserve the aesthetics or scenic beauty of the area?
  - b) Would the facility create a significant visual impact when seen from highly sensitive viewpoints or across a broad area of high scenic quality?
  - c) Does the facility utilize best practical mitigation to reduce or eliminate adverse aesthetic impacts of the facility?
2. If the facility is required by Federal Aviation Administration regulations to install aircraft warning lighting, then the facility shall utilize radar-activated lighting unless technically or economically infeasible. If such technology has not been approved for use by the FAA at the time the certificate has been granted, then as a condition of the certificate the project will be required to install radar-activated lighting within six months of FAA approval of such technology<sup>18</sup>.

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<sup>17</sup> These three criteria have been adapted from and reflect the three-part “Quechee test” developed in Vermont, and which is also reflected in the Vissering/CESA document posted on the OEP web site (*A Visual Impact Assessment Process for Wind Energy Projects*, page 27).

<sup>18</sup> This technology can eliminate one of the major unavoidable adverse impacts of wind power projects. It is in use on other types of tall structures but has not yet been approved for use on wind turbines by the FAA. FAA approval is likely but the time frame for their decision is not known. This provision would have been included as a condition of the Antrim certificate had the project been approved. It has also been required by permitting authorities or voluntarily proposed by applicants on other wind power projects in Vermont and Maine.



To accompany the Aesthetics Committee Report (even though some are general statements):

This document compiles my list of concerns either not addressed in our Aesthetics Committee Report or includes more detail and emphasis for those that were addressed. I was told it could accompany our committee report as a separate document as Thomas Getz's was allowed to do.

I vehemently oppose the participation, anonymity and in one instance, co-chairmanship, on the SB-99 SEC review process committees by business (attorneys, lobbyists, etc.). We were told it was a public process... the public should have the opportunity to speak. Instead, industry attempted to make it an industry process with paid representatives attempting to steer legislation to their advantage. Their goal is not a noble one, but one to make the path easy for their projects at the expense of the "little people". This *should* be a process concerned with the protection of NH and its residents, not businesses that wish to use and abuse NH.

In most cases, the representatives of these committees were forced to admit for whom they worked through persistent questioning, not volunteering the information at the committee meetings' or conference calls' inception. They were to announce themselves as they entered each conference call; the majority of the time they did not. They were requested to identify themselves each time they spoke; they did not. It took about six questions to determine who Terry De Wan represented. He first stated he was a landscape architect from Maine; when pursued *continuously and repeatedly*, he finally revealed he owned a consulting company and PSNH was one of his customers. If they do not feel they are doing something wrong, why the attempt at secrecy? In one conversation, Tom Getz stated he didn't believe there were any corporate representatives or attorneys on the call (no representatives disputed that statement by identifying themselves) yet immediately Kris Pastoriza disputed that statement and named a number of them supported by another name I had recorded. There was no response from Getz. It was also very interesting that at our final meeting in Concord, I believe only Tom Getz (a co-chair) was in attendance for the initial identification process...as the meeting progressed the other attorneys and representatives entered and managed to avoid identifying themselves. Many were no shows. If their motives are honorable, this would not be the case; they would not attempt to hide their identity and presence. Obviously, they were attempting to ease their pathway while making it appear as it was the citizens own concerns. *Industry views should not be allowed. If, by any unfair process they are allowed, their comments should be identified and attributed to their names and affiliations.*

There shall be a distinction made for permit applications between essential and non-essential, for profit projects . Since an SEC permit allows a project to preempt town zoning laws and regulations, options not available to the residents of the town, only projects that are absolutely essential to "keep the lights on" shall be allowed the privilege of preempting town zoning laws and regulations.

Citizens of the towns that will be paying the price for such invasions and possible destruction of their space deserve and need representation on the SEC committee. Affected town representation on the SEC shall include an equal number of voting privileges as the remainder of the committee. They will be the ones to suffer from these projects. This is *supposed to be* a free and democratic country with the government serving the people. The SEC decisions shall be based on town votes, regulations and master plans.

I want to emphasize the importance of the aesthetics from private property; private properties, including those in rural areas, shall be treated equally as properties with public

views. We live in rural areas for a reason, the natural beauty ... that reason should not be taken away from us, especially by a private, for profit project.

The corporation seeking a permit shall commit to a determined amount of property taxes for the life of the project (including appropriate depreciation) and not attempt in the future to reduce rates (as is currently taking place as PSNH sues towns for lower tax rates).

My final statement for rules involves decommissioning. The corporation presenting a project before the SEC shall show financial capabilities and commit in writing to maintain said capabilities and define its duty to remove all structures and restore the land to its original state upon its completion at the project corporation's expense.

Thank you very much for the opportunity to emphasize my concerns.

Dorothy McPhaul  
Sugar Hill

## REPORT OF THE SB 99 RULEMAKING ORDERLY DEVELOPMENT WORKING GROUP

### Executive Summary:

The Orderly Development Working Group's objectives were outlined by co-lead Shulman's introductory comments on the occasion of the group's first meeting on April 25:

*We are here to draft recommended rules to add substance to the Orderly Development site approval criterion set forth in RSA 162-H. We are not here to debate the pros and cons of one project or another except to the extent that such discussion informs our primary task of drafting rules. We are not here to draft rules that ensure the approval or denial of one project or another. We have a diversity of opinion on the subject present in our working group; we have significant expertise present in our working group; and we should use all of that to our advantage. If we are able to reach a consensus on a draft of rules, they will have greater force and credibility because of who we are.*

Aside from what seems to be a general agreement on the need for a comprehensive cost-benefit analysis as part of the assessment of any project's impact on the orderly development of the affected region, we were not able to reach agreement on anything.

- Simply defining "Orderly Development" proved to be a challenge. Narrowly and in the framework of existing rules, some interpret Orderly Development to mean that any proposed energy facility must maintain an appropriate balance among the potential adverse impacts and potential benefits of the facility on local land use, the local economies, and local employment within the region. But some view Orderly Development more broadly and interpret it to include such things as: The impact of a project on the "character" of a region; whether the project would satisfy a local need; whether "no development" should be considered the standard for "orderly" development in some circumstances; and whether such things as reliability and consideration of alternatives fall under the definition of Orderly Development.
- Beyond the basic challenge of trying to reach any sort of agreement on the definition of Orderly Development, there is considerable sentiment among local residents in our working group to modify the current language legislatively either by saying that the SEC must find that the site and facility will not unduly interfere with the orderly development of the region with significant consideration having been given to the views of municipal and regional planning commissions, municipal governing bodies, and the sentiments of the citizens in the region as expressed in official votes. And there are some who would go further and suggest that the SEC must find that the site and facility will not unduly interfere with the orderly development of the region, subject to the views of municipal and regional planning commissions, municipal governing bodies, and the sentiments of the citizens in the region as expressed in official votes.

- While there was general agreement that principles of cost benefit analysis should be employed by the applicant, an independent expert, or both, we were not able to gain consensus on a rule that would articulate and define how a project might “unduly interfere” with orderly development based on its potential economic impacts
- And finally there were differences of opinion on the definition of “region” with some preferring a simple reference to host and adjoining towns within a ten mile radius and others preferring a broader definition that includes any towns that are affected by the project in any way including visuals, impact on commerce, potential watershed impacts, air quality, traffic patterns and the like.

We also vigorously debated whether “reliability” falls under the Orderly Development criterion and, as might be expected, there was no consensus on this point. Some saw a connection between reliability and the due consideration clause. Their sentiment was that elective projects should not be permitted to trump local zoning, ordinances and planning. Others felt that the SEC should hold elective projects to a higher standard than projects deemed to be essential to the reliability of the grid but that reliability per se should not be a prerequisite for SEC approval.

## Work Summary:

The following is an illustration of what the components of a cost-benefit analysis or economic impact study might include. This is not presented as a work product of the group or as something on which we reached consensus or as a recommendation to the SEC. It is presented simply to show what we discussed; and the [Alternative or Additional Language] inserts are presented simply to illustrate some – but certainly not all – of the diversity of opinion within the group:

### 1. STUDIES REQUIRED

The developer shall present its perspective fully in its original proposal and any supplementary filings about the potential impact of a proposed project on the economy of the region that would be affected by the proposed project including:

[Alternative or additional language: Counsel for the Public shall engage an independent expert at the applicant's expense to assess the potential impact of a project on the economy of the region that would be affected by a proposed project including:]

- The potential positive and/or negative economic impacts of the project during the construction phase
- The potential on-going positive and/or negative economic impacts of the project in terms of employment and payments in lieu of taxes
- The potential positive or negative economic impacts of the project on tourism and recreation in the region based on the best available measures of activity of this sort including available research on the subject
- The potential positive or negative economic impacts of the project on businesses and services that are dependent in part or in whole on tourism and recreation in the region including comprehensive surveys of the vulnerable business sectors as to their dependency on tourism and recreation including second home owners
- The potential positive or negative impacts of the project on property values and the tax base in the region including primary residences and second homes in close proximity to the project and primary residences and second homes within the view shed of the project
- The potential positive or negative impacts of the project on town and municipal services and infrastructure, including potential decommissioning costs of the project
- The potential positive or negative impacts of the project on regional economic development plans and activities, including the ability to attract businesses, create employment opportunity

in the area, and preserve the ability to encourage second home development where that is important to the region.

- Any other potential positive or negative impacts of the project on the economy of the region

Consistent with established practice, all parties to proceedings shall have access to all data and supporting documentation for which the developer claims proprietary rights in its original proposal, any supplementary filings or in response to any request from the independent expert engaged by the Counsel for the Public.

**[Additional Language: The developer shall make available all data that may be requested by the independent expert for the purpose of performing this cost benefit analysis.]**

## 2. REGION DEFINED

For purposes of this criterion, the region affected by a project would be defined as:

The host towns, any towns within the view shed of the project, towns with businesses and services that depend in part or in whole on people who come to the area for tourism or recreational purposes, including second home owners, and towns where air quality, the watershed, and traffic patterns could be affected by the project

**[Alternative language: The host towns and any towns within a ten mile radius of the project.]**

## 3. FINDING

The SEC shall take into consideration:

**[Alternative language: Strike this lead in.]**

Any project that would pose a demonstrable risk of a material negative net present value of the positive and negative economic impacts of the project on the region in perpetuity would be deemed to interfere unduly with orderly development.

The economic advantages gained by individuals such as landowners who lease or sell their property to the developers shall not be considered a factor in terms of the project's impact on the economy of the region.

**[Alternative Language for all of the above: Total economic impact may be considered by the SEC, including, but not limited to: impact on the state's electricity rates (with equal consideration given to both reducing rates and keeping rates stable); employment; tax benefits to towns; economic benefits to private property owners, whether it be in the form of lease payments or property sales. If any negative impact on private property values is to be considered as part of the economic calculus considered by the SEC, then both positive and negative impacts to property must be included. Any studies, reports or testimony pertaining to property values must exhibit the extent and duration of impact for a period of not less than ten years]**

When calculating the net economic effect of a project upon a town, any financial mitigation offered by the project to the town shall not be considered a positive economic impact as, presumably, the financial mitigation is offset by the damage that is being mitigated.

**[Alternative language: Strike the word “presumably”.]**

The developer **[and the expert]** shall identify and describe in detail the economic impact of all other projects of similar nature and scope that have been constructed in any region in the continental United States that had economic and demographic characteristics similar to the proposed project area prior to the construction of the project.

#### **Additional Thoughts, Comments, Concerns and Suggestions from Individuals:**

Every project shall commit to announced tax payments for at least 10 years and shall pay any increases proportionately

Every project shall demonstrate financial capabilities and shall sign a contract stating they shall remove all structures and return the land to its condition prior to use at their expense

The establishment of any decommissioning fund shall be subject to the determination of the SEC and project specific. If a decommissioning fund is deemed necessary by the SEC, the project developer will be required to finance the fund on a present value basis. Particular scrutiny should be given by the SEC to projects whose shelf-life is considered to be fifteen years or less

The SEC shall consider burial of transmission lines as a means of mitigating their effects on orderly development, visual impacts, property values, watersheds, wetlands and community's master plan values and goals.

Underground burial of transmission lines should always be the preferred method and burial should be mandatory for “not needed to keep the lights on, for profit - merchant funded projects”

When an applicant proposes to utilize existing rights of way, the proposal should not significantly differ from existing infrastructure (i.e, 40 foot wooden poles to 40 foot wooden poles) unless it is less obtrusive.

The SEC shall take into consideration the surrounding environment at the time the existing rights of way were given in relation to the surrounding environment presently. (For example, what was forested land in 1930 through 1950 when easements were given to PSNH, is now residential.

The SEC shall take into account, when making its decision regarding a project, whether the particular project has a ripple effect in other areas. For example, when there is a proposal for a wind project, the height of the transmission poles and size of the lines must be studied on the impact of the surrounding area

Representation by members of the public from affected area(s) shall serve on the SEC with equal voting rights

Private views shall be credited the same importance as public views. Referred to aesthetics

A project shall not be located within xxxx feet of animals, structures and xxxx feet of a school...double or triple whatever is deemed safe. Referred to noise health safety

The public members appointed to participate in hearing a proposed project by the SEC shall be vetted in such a way that such public selectee shall have no past or current relationship with the applicant, including but not limited to stockholders, employees/or former employees, relatives, or business relationship with said applicant. The public selectee shall never have received anything of value from the applicant

We would also like to comment that any recommendations relating to the composition of the SEC should not be part of our report to OEP. SB 245 has addressed SEC composition, receiving vigorous debate in both chambers of the NH legislature and many stakeholders worked tirelessly to come up with language that was amenable to most parties involved.

The SEC shall take into consideration the source of renewable energy projects and was the project “clean” and environmentally sound at its source. If the source does not meet standards in this country, it should be negated as being acceptable when received from a foreign country

The SEC shall take into account the security measures set forth by the applicant to ensure that the project is has taken proactive steps to deter terrorist activities. The SEC shall also take into account the security measures set forth at the source of the energy.



## **Appendix A – Working Group Members**

Marc Brown, Executive Director, New England Ratepayer's Association

Jo Anne Carr, Director of Planning and Economic Development, Jaffrey, NH

Arthur Cunningham, Attorney representing Owl's Nest

Tom Getz, Attorney at Devine Millimet (Co-Lead)

Mary A. Lee of Northfield, NH

Dolly McPhaul of Sugar Hill, NH

Michael Marino of Holderness, NH

Lee Ann Moulder, Holderness, NH

Thomas N.T. Mullen, Member, Alliance against Northern Pass

Master Developer, Owl's Nest Resort & Golf Club

Mike Novello, Wagner Forest Management

Kris Pastoriza of Easton, NH

Lisa Shapiro, Chief Economist, Gallagher, Callahan & Gartrell

Steve Shulman, Management Consultant, Bridgewater, NH (Co-Lead)

Peter Silbermann, Environmental Engineer (retired), Bridgewater, NH

Bob Tuveson of Holderness, NH

## **Appendix B – Schedule of Meetings**

Friday, April 25 – 2:00 PM – 4:00 PM: See meeting summary in Appendix E

Monday, May 5 – 2:00 PM – 4:00 PM: Initial point-by-point review of draft report as a means to engage participants, solicit opinion, and draft compromise or alternative language

Tuesday, May 13 – 2:00 PM – 4:00 PM: Continuing point-by-point review of draft report

## **Appendix C – Opinion Piece from Tom Getz**

I wanted to share some thoughts on reliability, need, state energy policy, alternatives, and environmental issues. As explained below, for a variety of reasons these issues are beyond the scope of the SEC's review when considering orderly development and thus should not be addressed in the corresponding rules.

In summary, orderly development is not a catchall category that would permit the SEC to include any other issue it wants to include. Orderly development is a separate, independent element of the findings analysis the SEC must conduct when it determines whether to issue a certificate.

The SEC, moreover, has established well-defined parameters for its analysis through precedent and rules. The focus of orderly development is on local land use, the local economy, and local employment within the region. Within those subcategories, the SEC has also considered, for instance, tourism and recreation, property values, and decommissioning.

In 2009, the Legislature repealed RSA 162-H:16, IV (d) and V. As a result, there are no requirements that the SEC make findings regarding consistency with state energy policy, present and future need for electricity, or adverse effects on system stability and reliability. It would be inconsistent with the Legislature's action repealing those findings to re-insert the issues under the heading of orderly development.

With respect to system stability and reliability, which is an electrical issue, effectively it is the ISO-NE that considers the merits of the issue. A large energy facility will not be permitted to interconnect to the system unless the ISO-NE gives its approval, and the SEC has included conditions to that effect in its orders. There is another issue that is discussed in terms of reliability, which concerns whether a project is eligible for regional cost allocation under ISO-NE rules. The Legislature has determined that a public utility may not petition to take land for a facility that is not eligible for regional cost allocation.

In both aspects of reliability, the issues are unrelated to whether a particular facility would unduly interfere with the orderly development of the region.

With respect to need, the restructuring of the electric industry in New Hampshire fundamentally changed the statutory and regulatory approach. In a vertically integrated world of price-regulated public

utilities, utility commissions typically examine whether utility decisions are prudent and whether utility rates are reasonable. In the restructured environment in NH, the Legislature has sought instead to harness the power of competitive markets to reduce costs for consumers. As a result, in the context of siting an energy facility, there is no longer an agency determination that a facility is required to meet the present or future need for electricity. A similar analysis applies with respect to consistency with state energy policy. New Hampshire has adopted an energy policy predicated on competition; therefore, an additional agency determination on consistency with state energy policy is unnecessary.

With respect to alternatives, the SEC has included discussions of available alternatives in its decisions, immediately prior to its discussions of the 162-H:16, IV statutory criteria. Those discussions also reflect the change to a restructured regulatory environment in New Hampshire in that they address for the most part the applicant's site selection process and site configurations.

The SEC's decisions essentially recognize that applicants in a restructured model do not have the alternatives available to them that public utilities under a vertically integrated model with rights of eminent domain have.

Finally, RSA 162-H:16, IV (c) includes consideration of whether, among other things, a facility will have unreasonable adverse effects on aesthetics, air and water quality, and the natural environment.

Inasmuch as environmental issues are considered separately, they do not need to be included as part of orderly development

## **Appendix D - Edits to Existing Rules Suggested by Joanne Carr**

### **Statutory Authority**

**162 H:7** requires that each application describe in reasonable detail the type and size of each major part of the proposed facility; identify both the preferred choice and any other choices for the site of each major part of the proposed facility; describe in reasonable detail the impact of each major part of the proposed facility on the environment for each site proposed; describe in reasonable detail the applicant's proposals for studying and solving environmental problems; describe in reasonable detail the applicant's financial, technical, and managerial capability for construction and operation of the proposed facility; document that written notification of the proposed project, including appropriate copies of the application, has been given to the appropriate governing body of each community in which the facility is proposed to be located; provide such additional information as the committee may require to carry out the purposes of 162 H.

Further the site evaluation committee and counsel for the public shall jointly conduct such reasonable studies and investigations as they deem necessary or appropriate to carry out the purposes of this chapter and may employ a consultant or consultants, legal counsel and other staff in furtherance of the duties imposed by this chapter, the cost of which shall be borne by the applicant in such amount as may be approved by the committee.

### **RULES**

#### **Part Site 301 REQUIREMENTS FOR APPLICATIONS FOR CERTIFICATES**

##### **Site 301.01 Filing**

Site 301.03 Contents of Application.

(a) Each application for a certificate of site and facility for an energy facility, a renewable energy facility, or a bulk power supply facility shall be signed and sworn to by the person, or the executive officer of the association or corporation, making such application.

(b) Each application shall include the information contained in this subparagraph, and subparagraphs (c) through (k) below, as follows:

(1) The name of the applicant;

(2) The applicant's mailing address, telephone and fax numbers, and e-mail address;

(3) The name and address of the applicant's parent company, association or corporation if the applicant is a subsidiary;

(4) If the applicant is a corporation;

- a. The state of incorporation;
- b. The corporation's principal place of business; and
- c. The names and addresses of its directors, officers and stockholders;

(5) If the applicant is an association, the names and addresses of the residences of the members of the association;

(6) Whether the applicant is the owner or lessee of the site or facility or has some legal or business relationship to it; and

(7) A statement of assets and liabilities of the applicant.

(c) Each application shall contain the following site information:

(1) The location and address of the site of the proposed facility;

(2) Site acreage, shown on an attached property map and located by scale on a U.S. Geological Survey or GIS map;

(3) The location of residences, industrial buildings, and other structures and improvements within or adjacent to the site;

- a) **If transmission project or wind turbine project locate residences, public open spaces such as conservation lands, water bodies larger than 10 acres, and navigable waters within the viewshed.**
- b) **If biomass, fossil fuel, nuclear or other facility with potential air quality impacts, map downwind airshed.**

(4) Identification of wetlands and surface waters of the state within or adjacent to the site, **and hydrologic unit;**

(5) Identification of natural and other resources at or within or adjacent to the site.

- a) **Reference most current municipal or regional Natural Resource Inventory, Open Space Plan, Cultural or Historical Resource Plan, Watershed Management Plan, and zoning.**
- b) **Reference most current statewide inventories including but not limited to the NH Wildlife Action Plan, NH State Parks Plan, and State Land Use Plan (Granite State Future).**

(6) Information related to whether the proposed site and facility will unduly interfere with the orderly development of the region having given due consideration to the views of municipal and regional planning commissions and municipal governing boards.

- a) **Cite municipal concurrence with facility development proposal. Concurrence to be obtained from each municipality impacted as noted above in 301.03 (c) (3) (a & b)**

**b) Cite Regional Planning Commission concurrence with facility development proposal.**

(d) Each application shall include information about other required applications and permits as follows:

- (1) Identification of all other federal and state government agencies having jurisdiction, under state or federal law, to regulate any aspect of the construction or operation of the proposed facility;
- (2) Documentation that demonstrates compliance with the application requirements of such agencies;
- (3) A copy of the completed application form for each such agency; and
- (4) Identification of any requests for waivers from the information requirements of any state agency or department whether represented on the committee or not.

(e) If the application is for an energy facility, the application shall include:

- (1) The type of facility being proposed;
- (2) A description of the process to extract, produce, manufacture, transport or refine the source of energy;
  - a) Identify regional transportation routes**
  - b) Address noise, odor and aesthetic issues**
  - c) Describe in detail environmental protection measures**
- (3) The facility's size and configuration;
- (4) The ability to increase the capacity of the facility in the future;
- (5) Raw materials used, as follows:
  - a. An inventory, including amounts and specifications;
  - b. A plan for procurement, describing sources and availability; and
  - c. A description of the means of transporting; and
- (6) Production information, as follows: **this section should be updated**
  - a. An inventory of products and waste streams;
  - b. The quantities and specifications of hazardous materials; and

c. Waste management plans.

(f) If the application is for an electric generating unit which is either a bulk power facility or a renewable energy facility, the application shall include the following information:

- (1) Make, model and manufacturer of the unit;
- (2) Capacity in megawatts, as designed and as intended for operation;
- (3) Type of unit, including:
  - a. Fuel utilized;
  - b. Method of cooling condenser discharge;
  - c. Whether the unit will serve base, intermediate or peaking loads;
  - d. Unit efficiency; and
  - e. Impact on system stability and reliability;

**(X) Coherence with the State's Energy Strategy**

- (3) Any associated new substations and transmission lines;

**(XX) Alternatives analysis for facility location, routes and transmission lines.**

- (4) Construction schedule, including start date and scheduled completion date.

**(XXX) Decommissioning plan and financial security.**

(g) If the application is for a transmission line or a bulk power facility or renewable energy facility with an associated transmission line, the application shall include the following information:

- (1) Location shown on U.S. Geological Survey Map;
- (2) Corridor width for:
  - a. New route; or
  - b. Widening along existing route.

**c. Alternative routing, including burial.**



- (3) Length of line;
- (4) Distance along new route;
- (5) Distance along existing route;
- (6) Voltage (design rating);
- (7) Any associated new generating unit or units;
- (8) Type of construction (described in detail);

**(X) Visual Impact Assessment**

- (9) Construction schedule, including start date and scheduled completion date; and
- (10) Impact on system stability and reliability.

(h) Each application shall include the following:

- (1) A description in detail of the type and size of each major part of the proposed facility;
- (2) Identification of the applicant's preferred location and any other options for the site of each major part of the proposed facility;

**a) Alternatives analysis shall address local and regional conservation and development goals**

- (3) A description in detail of the impact of each major part of the proposed facility on the environment for each site proposed;

**a) Environmental Impact Assessment shall address local and regional open space planning and resource conservation goals.**

- (5) A description in detail of the applicant's proposals for studying and solving environmental problems;

**a) Plans shall include avoidance, mitigation and remediation measures.**

- (5) A description in detail of the applicant's financial, technical and managerial capability to construct and operate the proposed facility;
- (6) A statement of assets and liabilities of the applicant; and

(7) Documentation that written notification of the proposed project, including appropriate copies of the application, has been given to the governing body of each community in which the facility is proposed to be located.

(i) Each application shall include information regarding the effects of the facility on, and plan for mitigation of any effects for, the following **with specific reference to local, regional and state planning documents :**

- (1) Aesthetics;
- (2) Historic sites;
- (3) Air quality;
- (4) Water quality;
- (5) Natural environment; and
- (6) Public health and safety.

(j) Each application shall include information regarding the effects of the facility on the orderly development of the region, including the applicant's estimate of the impacts of the construction and operation of the facility on :

**Concurrence to be determined by reference to but not limited to local land use codes, economic development, energy and open space plans.**

- (1) Local land use;
- (2) Local economy; and
- (3) Local employment.

(k) Each application shall include pre-filed testimony and exhibits supporting the application.

## Appendix E – Meeting 1 Summary

### Summary of SB 99 Orderly Development Criterion Conference Call – April 25, 2014

The following is at least a partial list of people who announced their attendance at the Orderly Development working group conference call on Friday, April 25, 2014: Co-leader Tom Getz, Kris Pastoriza, Susan Schibanoff, Dolly McPhaul, Mike Novello, Lisa Frantzis, Peter Silbermann, Lisa Shapiro, Robert Tuveson, Stuart Smith, Steve Shulman, Leann Moulder, Michael Marino, State Representative Suzanne Smith, Mary Lee, Tom Mullen, Mark Brown, Hugh Montgomery and Gail Beaulieu.

Co-leader Shulman started the conference call by stating the following:

*We are here to draft recommended rules to add substance to the Orderly Development site approval criterion set forth in RSA 162-H. We are not here to debate the pros and cons of one project or another except to the extent that such discussion informs our primary task of drafting rules. We are not here to draft rules that ensure the approval or denial of one project or another. We have a diversity of opinion on the subject present in our working group; we have significant expertise present in our working group; and we should use all of that to our advantage. If we are able to reach a consensus on a draft of rules, they will have greater force and credibility because of who we are.*

The meeting then moved to introductions of all the participants and a review of the proposed agenda, which emphasized that the agenda was flexible. There followed a brief description of the stakeholder process, the statute and rules applying to orderly development, pending legislation that might have an impact on the process and the SEC, and possible outcomes.

There was a lengthy discussion about the definition of “Orderly Development” and related matters that focused substantially these issues:

- Should the host communities essentially have veto power under the Orderly Development criterion by virtue of local zoning and master planning and/or local voting; and, if not, how heavily should the SEC weigh those factors in its deliberations?
- Does the need for the power generated and/or transmitted by a proposed project have any bearing on Orderly Development?
- How should the economic impact of a project on a region be assessed and what type of impact would constitute undue interference in the orderly development of the region?

There was general agreement that the group’s focus at this initial stage should be on the task of reaching agreement regarding priorities, suggestions, and principles. The extent to which the group will focus on the task of translating the priorities, suggestions, and principles into specific rules will depend on the time available. Participants were encouraged to submit drafts of a definition of Orderly

Development that might serve as a preamble to rules. Six drafts were submitted and they are attached as Appendix A.

The notion of some form of mandated cost-benefit/input output analysis of the economic impact of a project seemed to have broad support and mention of the impact of a project on the regional economy found its way into all of the drafts that were submitted. There was some discussion about the types of studies that should be done, who might do them, and who would be responsible for the cost, but we did not have time to go into the previously distributed draft of rules mandating studies of economic impacts in any depth (Appendix B).

We will continue working on this in the weeks ahead. We hope to achieve some agreement on an appropriate definition of Orderly Development as a preamble to actual rules and we hope to offer specific suggestions for rules. It seems unlikely that we will achieve a consensus on the rules per se, but we can certainly provide material that reflects the various perspectives of the members of our working group.

### **Summary of April 25 Meeting - Appendix A**

Tom Mullen

The "Orderly Development" of an energy facility in the State of New Hampshire is overseen by the New Hampshire Site Evaluation Committee (NH SEC). It is a process that evaluates and approves permitting of the improvement, expansion or construction of any energy facility anywhere within the borders of the State of New Hampshire. The purpose of this process is to make sure energy facilities are developed in an organized, logical and orderly manner, one that has been shown through a series of public hearings, to be needed by and acceptable to the residents of a municipality or a region being impacted by the proposed energy facility. A region for the purpose of this definition of "orderly development" consists of three or more abutting municipalities. For the NH SEC to issue a permit for a new energy facility, it must be shown through a series of public meetings that the project will not have an unreasonably adverse impact on the "orderly development" of its host municipalities or regions. If and when it is determined through the permitting process that such an adverse impact will result from the proposed new facility, the NH SEC shall give very heavy consideration to those impacts during its deliberations on whether or not to issue an NH SEC approval for said energy facility.

During the processing of an application for approval of a "Merchant Funded" energy facility, one that by definition is "not needed for system reliability," if the NH SEC finds that the project will have an unreasonably adverse impact on the "orderly development" of any of its host municipalities or regions, this one finding alone will serve as an adequate basis for denying a permit to the project.

During the public hearing process, an energy facility seeking a NH SEC approval shall be deemed to cause an unreasonably adverse negative impact on the "orderly development" of its host municipalities or the region where it proposes to locate when i) it conflicts with the master plans of three or more abutting host municipalities or when three or more such municipalities vote in their annual meetings or other legally called public meetings

against the issuance of an approval for the facility; or ii) the proposed facility cannot demonstrate to the NH SEC, a net economic benefit to the region.

The NH SEC may also provide to the applicant for any given energy facility that it turns down, one or more alternative methods of orderly development for said facility that the NH SEC may be willing to approve.

Peter Silbermann

Orderly development is the planning and advancement of a project that takes into consideration: the needs of the region; the impacts of the project on existing land use; and the economy and employment of the region while enabling growth and improvement in a logical and methodical manner. The proposed project shall demonstrate a net positive effect on the region and is considered orderly when it conforms to local and regional plans and considers the needs of the area while not interfering with or causing undue adverse impacts on the region.

Susan Shibano

An energy facility shall be deemed to adversely impact the “orderly development” of the region when a) it conflicts with the master plans of [three or more] host or abutting towns or when [three or more] such towns vote in a town meeting or other legally valid method against the facility; or b) the proposed facility cannot demonstrate a net economic benefit to the region.

Kris Pastoriza

The SEC shall define orderly development as requiring energy projects to be subject to the same full and customary state, local and regional review and public comment, scrutiny and restrictions as new private hospitals (health), new private universities (education), new private food processing plants (food), or new private manufacturing businesses (jobs). Orderly development shall not include the siting of private, merchant energy projects not determined by ISO-NE as necessary for system reliability. This would create consistency across development categories and recognize that in most communities orderly development is quite clearly and deliberately defined by the limitations placed on development; restrictions in zoning.

The SEC process should require applications to present detailed analysis of reasonable alternatives, and the SEC should have the authority to require a serious alternatives analysis if it is not presented by the project sponsor. The applicant should be required to fund these studies and the affected towns allowed to hire a contractor of their own choosing. On points that may not be fully covered (in an evidentiary sense) by the competing studies of the developer and the public, the SEC itself should be required to commission objective expert input.

The SEC should consider the psychological well-being of residents as part of its assessment of public benefit or harm. An unwanted, visually offensive, noisy or malodorous project will have detrimental effects on people that will not register in a standard economic analysis.

If a town votes against a project, that project will not be considered orderly development by the SEC.

Steve Shulman

The Orderly Development criterion in RSA 162H shall be interpreted to refer to the potential impact a proposed project might have on the economy and character of the region. Undue Interference shall be interpreted to refer to any project that could have a material negative impact on the economy of the region and/or that would substantively alter the character of the region in a way that could reasonably be considered negative.

Mike Novello

Orderly Development - Furthering growth, economic development, economic activity, or social advancement within a host City, Town, Township, Location, Grant, or Purchase in a methodical manner, subject to applicable rules and laws.

To accompany the Orderly Development Report (although some are general statements):

This document compiles my list of concerns either not addressed in our Orderly Development report or includes more detail and emphasis for those that were addressed. I was told it could accompany our committee report as a separate document, as was Thomas Getz's.

I vehemently oppose the participation, anonymity and in one instance, co-chairmanship, on the SB-99 SEC review process committees by business (attorneys, lobbyists, etc.). We were told it was a public process... the public *should* have the opportunity to speak. Instead, industry attempted to make it an industry process with paid representatives attempting to steer legislation to their advantage. Their goal is not a noble one, but one to make the path easy for their projects at the expense of the "little people". This *should* be a process concerned with the protection of NH and its residents, not businesses that wish to use and abuse NH.

In most cases, the representatives of these committees were forced to admit for whom they worked through persistent questioning, not volunteering the information at the committee meetings' or conference calls' inceptions. They were to announce themselves as they entered each conference call; the majority of the time they did not. They were requested to identify themselves each time they spoke; they did not. It took about six questions to determine who Terry DeWan represented. He first stated he was a landscape architect from Maine; when pursued *continuously and repeatedly*, he finally revealed he owned a consulting company and PSNH was one of his customers. If they do not feel they are doing something wrong, why the attempt at secrecy? In one conversation, Tom Getz stated he didn't believe there were any corporate representatives or attorneys on the call, a statement immediately disputed by Kris Pastoriza who named a number of them, supported by another name I noted. There was no reply from Getz. It was also very interesting that at our final meeting in Concord, I believe only Tom Getz (a co-chair) was in attendance for the initial identification process...as the meeting progressed other attorneys and representatives entered and managed to avoid identifying themselves. Many were no shows. If their motives are honorable, this would not be the case; they would not attempt to hide their identity and presence. Obviously, they were attempting to ease their pathway while making it appear as it was the citizens own concerns. *Industry views should not be allowed. If, by any unfair process they are allowed, their comments should be identified and attributed to their names and affiliations.*

There shall be a distinction made for permit applications between essential and non-essential, for profit projects . Since an SEC permit allows a project to preempt town zoning laws and regulations, options not available to the residents of the town, only projects that are absolutely essential to "keep the lights on" shall be allowed the privilege of preempting town zoning laws and regulations.

Citizens of the towns that will be paying the price for such invasions and possible destruction of their space deserve and need representation on the SEC committee. Affected town representation on the SEC shall include an equal number of voting privileges as the remainder of the committee. They will be the ones to suffer from these projects. This is *supposed to be* a free and democratic country with the government serving the people. The SEC decisions shall be based on town votes, regulations and master plans.

I want to emphasize the importance of the aesthetics from private property; private property, including those in rural areas, shall be treated equally as properties with public views. We live in rural areas for a reason, the natural beauty ... that reason should not be taken away

from us, especially by a private, for profit project.

The corporation seeking a permit shall commit to a certain amount of property taxes for the life of the project (including appropriate depreciation) and not attempt in the future to reduce rates (as is currently taking place as PSNH sues towns for lower tax rates).

My final statement for rules involves decommissioning. The corporation presenting a project before the SEC shall show financial capabilities and commit in writing to maintain said capabilities and define its duty to remove all structures and restore the land to its original state upon its completion at the projects corporation's expense..

Thank you very much for the opportunity to emphasize my concerns.

Dorothy McPhaul  
Sugar Hill



# **NH OEP SB 99 Pre-Rulemaking Process**

## **Health and Safety Work Group**

### **Executive Summary**

The objective of the Health and Safety was to consider safety criteria and standards for the proper siting of large-scale wind energy facilities and transmission.

Areas of focus included wind turbine noise emissions, safety setbacks and other mitigations for shadow flicker, ice throw, blade shear, turbine collapse and other catastrophic events. The group also looked at the question of high voltage transmission siting.

The topics discussed by the group were complex, each representing a significant body of experience and technical study that extends far beyond what could be addressed in the short time available. Experts were invited to participate in the meetings to help inform the group. This was particularly important on the topic of noise emissions.

The Health and Safety work group was made up a diverse group of participants representing industry, town officials, NGOs and members of the public. In total, there were nineteen members in the group. Roughly 15 attended each meeting.

The work group met via conference call on six separate occasions. Each call lasted ninety minutes and was well attended. In addition, members attended the April 30, May 16 and May 28 status meetings scheduled by the Advisory Council.

### **Work Summary by Topic**

#### **1. Key Findings - Wind Turbine Noise Emissions**

During recent SEC dockets, in particular the Groton Wind and Antrim Wind proceedings, substantial time was spent examining and challenging the various sound studies prepared by the applicants in trying to arrive at a noise limit where the projects would operate without creating an unreasonable adverse effect on the community. Much of the time spent could have been avoided, and the process streamlined, had the SEC adopted standards defining the purpose of various studies and appropriate protocols needed to ensure reliable, repeatable post-construction results.

National (ANSI, ASA etc.) professional standards exist that clearly articulate the process of conducting these studies. The work group spent considerable time discussing the types of studies specified in the standards and the purpose of each study.

## **1.1. Areas of Agreement**

The work group agreed on the following points pertaining to wind turbine noise:

- Professional standards should be utilized for conducting noise surveys<sup>1</sup>;
- Three primary studies may be necessary in evaluating wind turbine noise emissions:
  - pre-construction baseline survey,
  - predictive modeling, and
  - post-construction compliance monitoring.

A brief description of each study is provided in Appendix C.1.

Beyond these two points, it was very difficult to fully assess areas where agreement could be reached (by the broader group) as much of the time spent in meetings involved moderated technical discussions among professional acousticians fluent in the topic of wind turbine noise, as well as the procedures required for conducting the studies successfully.

However, it was clear during these discussions that there is considerable agreement between the acousticians, and also some disagreement. Table 1.a lists the points of consensus between the acousticians.

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<sup>1</sup> At the time of this writing, NH Senate Bill 281 addressing SEC rulemaking for wind energy systems passed both the Senate and the House. The bill requires the SEC to address "project-related sound impact assessment prepared in accordance with professional standards by an expert in the field."

**Table 1.a**

<b>NOISE</b>	
<b>Pre-construction baseline survey</b>	
1.	Adherence to the ANSI/ASA S12.9-2013 Part 3 standard, a standard that requires short-term <i>attended</i> measurements.
2.	Long-term <i>unattended</i> monitoring may be conducted in accordance with ANSI S12.9-1992/Part 2, provided audio recordings are taken in order to clearly identify and remove transient noises from the data. Frequencies above 1250 Hz 1/3 octave band are to be filtered out of the data.
3.	Measurement locations should be conducted at the nearest properties from proposed wind turbines representative of all non-participating residential properties within 2.0 miles.
4.	Sound measurements shall be omitted when the wind velocity is greater than 4 m/s (~9 mph) at the microphone position, when there is rain, and/or with temperatures below instrumentation minima. Following ANSI 12.9 Part 3 protocol, microphones shall be placed 1 to 2 meters above the ground, and at least 15 feet from any reflective surface. A windscreen of the type recommended by the monitoring instrument's manufacturer must be used for all data collection. Microphones should be field calibrated before and after measurements. An anemometer shall be located within close proximity to each microphone.
5.	Pre-construction sound reports shall include a map and/or diagram clearly showing the following: <ul style="list-style-type: none"> <li>• layout of project area, including topography, project boundary lines, property lines;</li> <li>• locations of the Measurement Points (MPs);</li> <li>• distance between any MP and the nearest wind turbine(s);</li> <li>• location of significant local non-turbine sound and vibration sources;</li> <li>• distance between all MPs and significant local sound sources;</li> <li>• The location of all sensitive receptors including, but not limited to: schools, day-care centers, hospitals, residences, residential neighborhoods, places of worship, and elderly care facilities.</li> </ul>
6.	Applicant will provide A weighted and C weighted sound levels for L10, $L_{eq}$ and L90.
<b>Preconstruction Predictive Modeling</b>	
7.	Predictive modeling will be conducted in accordance with ISO 9613-2.
8.	An adjustment to the $L_{eq}$ produced by the model shall be applied in order to adjust for turbine manufacturer uncertainty. This adjustment shall be determined in accordance with the most recent release of the IEC 61400 Part 11 standard (Edition 3.0 2012-11). This standard anticipates that the analysis of wind turbine acoustical emissions will also consider sound power level and tonality for a batch of wind turbines as opposed to just one machine (IEC 61400 Part 14).
9.	Predictions shall be made at all properties within two (2) miles from the project turbines for the wind speed and operating mode that would result in the worst case wind turbine sound emissions at night.
10.	Other corrections for model's algorithm error shall be disclosed and accounted for in the model(s).
<b>Post-Construction Compliance Monitoring</b>	
11.	Adherence to the ANSI/ASA S12.9-2013 Part 3. This standard requires short-term attended measurements to ensure transient noises are removed from the data. Measurements will include at least one nighttime hour where turbines are operating at full sound power with winds less than 3 m/s (~6 mph) at the microphone.
12.	Unattended long-term monitoring can also be conducted.
13.	Sound measurements shall be omitted when there is rain, and/or with temperatures below

	instrumentation minima. Microphones shall be placed 1 to 2 meters above the ground and at least 15 feet from any reflective surface following ANSI 12.9 Part 3 protocol. Proper microphone screens are required. Microphones should be field calibrated before and after measurements. An anemometer shall be located within close proximity to each microphone.
14.	Monitoring will involve measurements being made with the turbines in both operating and non-operating modes. SCADA data will be used to record hub height wind speed and turbine power output.
15.	Locations to be pre-selected where noise measurements will be taken. Measurements will be performed at night with winds above 4.5 m/s (~10 mph) at hub height and less than 3 m/s (~6 mph) on the ground.
16.	All sound measurements during post-construction monitoring will be taken at 0.125-second intervals measuring both "fast" response and $L_{eq}$ metrics..
17.	Post-construction monitoring surveys will be conducted once within three months of commissioning, and once each season thereafter for the first year. Additional surveys may be conducted at the request of the SEC. Reasonable adjustments to this schedule will be permitted subject to SEC review.
18.	<p>Post-construction sound reports shall include a map and/or diagram clearly showing the following:</p> <ul style="list-style-type: none"> <li>• layout of project area, including topography, project boundary lines, property lines;</li> <li>• locations of the Measurement Points (MPs);</li> <li>• distance between any MP and the nearest wind turbine(s);</li> </ul> <p>For each measurement period during the post-construction monitoring, reports will include each of the following measurements:</p> <ul style="list-style-type: none"> <li>• <math>LA_{eq}</math>, <math>LA_{10}</math>, and <math>LA_{90}</math>;</li> <li>• <math>LC_{eq}</math>, <math>LC_{10}</math>, and <math>LC_{90}</math></li> </ul>
19.	Noise emissions shall be free of audible tones. If the presence of a pure tone frequency is detected, a 5 dB penalty shall be added to the measured dBA sound level.
20.	The SEC shall adopt a complaint resolution program. Validation of noise complaints shall require field sound surveys conducted under the same meteorological conditions as occurred at the time of the complaint.

## 1.2. Areas Without Agreement

Disagreements between the acousticians were technical in nature and related to how field sound surveys and predictive modeling should be conducted. The points of disagreement are detailed in Table 1.b.

**Table 1.b**

NOISE - Areas without agreement	
Question of need	Mike Novello argued that pre-construction baseline studies should be focused on informing the SEC about the applicant's ability to meet post-construction compliance criteria. As those criteria were not established by the work group, he questioned whether pre-construction baseline studies were necessary.
Adherence to the standards	There is disagreement regarding how closely the standards are to be followed.
Uncertainty factor	Additional uncertainty factor relating to wind shear or other meteorology that is not adequately addressed by the model.

Ground absorption factor	Ground absorption factor to be applied in the predictive modeling.
Unattended v. attended monitoring	Disagreement on whether both methods are required when conducting post-construction compliance measurements.
Location of monitors	Location of where measurements should be taken.
Project layout and noise	Minimum distance between turbines, measured in rotor diameters
Noise limits	All work group members and acousticians agreed the SEC should establish a noise limit against which a project is judged as unreasonably adverse. There was disagreement on what that limit should be.

### 1.3. Alternative Proposals for Areas Without Agreement

Table 1.c details the alternative positions offered by the expert acousticians as well as the work group participants on areas where agreement could not be reached.

**Table 1.c**

<b>NOISE - Alternative Proposals For Areas Without Agreement</b>	
<b>Pre-construction Predictive Modeling</b>	
Adherence to standards	<ul style="list-style-type: none"> <li>Rick James argued that adherence to the ANSI/ASA S12.9-2013 Parts 2 and 3 protocols is important and there is no justification for following some portions of the standards and not others.</li> <li>Ken Kaliski argued that monitoring be conducted consistent with the relevant portions of ANSI/ASA S12.9-2013 Parts 2 and 3.</li> </ul>
Uncertainty factor	<ul style="list-style-type: none"> <li>Rick James argued that the added factor should be +3 dB.</li> <li>Ken Kaliski argued that the factor should be between 0 to +3 dB.</li> <li>Fred Ward argued models are only used when there are many of a kind with similar characteristics. "Just as there are (allegedly) no two snowflakes alike, there are no two hills or ridges alike, and the differences are major. The whole concept of modeling hills or ridges should give any reputable scientist or engineer the shakes. Given the enormous differences in the topography and meteorology from one hill to the next, any 'hill' model, or a flat land model adapted for hills, must have a very large factor of uncertainty."</li> </ul>
Ground absorption factor	<ul style="list-style-type: none"> <li>Rick James argued that a ground factor of G=0 would more accurately reflect NH terrain.</li> <li>Ken Kaliski argued a mixed ground factor of G=0.5 would be adequate, with G=0 on in areas of hard, non-porous ground.</li> <li>Fred Ward supported a ground absorption factor of G=0 given the likelihood of many months where NH ridgelines are covered in ice.</li> </ul>
<b>Post-Construction Compliance Monitoring</b>	
Adherence to standard	<ul style="list-style-type: none"> <li>Rick James argued that adherence to the ANSI/ASA S12.9-2013 Parts 2 and 3 protocols is important and there is no justification for following some portions of the standards and not others.</li> <li>Ken Kaliski argued that monitoring be conducted consistent with the relevant portions of ANSI/ASA S12.9-2013 Parts 2 and 3.</li> </ul>
Unattended v. attended monitoring	<ul style="list-style-type: none"> <li>Rick James argued that short-term attended studies were more accurate and better able to assess the sound levels emitted by the turbines. Long-term attended studies</li> </ul>

	<p>could be conducted, but not to the exclusion of attended studies.</p> <ul style="list-style-type: none"> <li>Ken Kaliski argued that long-term unattended surveys gave a greater opportunity to evaluate worse-case conditions and that attended surveys were not needed.</li> <li>Both agreed that there was no problem conducting both types of sound surveys</li> </ul>
Location of monitors	<ul style="list-style-type: none"> <li>Rick James argued that noise measurements be conducted at the property lines.</li> <li>Ken Kaliski argued that nighttime measurements be taken within 200 feet of a residence or the property line, whichever is closest. If a separate daytime noise limit is adopted then monitoring could be at the property line to assess that limit.</li> <li>Members of the group who voiced a concern argued that noise limits be specified at non-participants' property lines.</li> </ul>
Project design and noise	<ul style="list-style-type: none"> <li>Rick James argued that wind turbines spaced less than 5-7 rotor diameter widths apart could introduce wake turbulence that would increase project noise emissions.</li> <li>Ken Kaliski argued there was no basis for this claim, especially in a noise standard.</li> </ul>

## 1.4. Other General Comments

One area of interest that the work group did not have time to fully explore was the discussion of noise limits against which projects would be judged as unreasonably adverse.

While each wind application before the SEC has included an examination of project noise emissions, there has been very little consistency in the noise conditions imposed by the Committee. Table 1.d lists the limits set by the SEC in each wind project decision.

**Table 1.d**

SEC Noise Limits by Project	
Lempster Wind	<ul style="list-style-type: none"> <li>Town agreement differed from the SEC standard. Measured 300 feet from existing, occupied buildings. Different standard for the Goshen/Lempster school.</li> <li>SEC standard triggered mitigation measures including installing Energy Star air-conditioners in bedrooms of non-participating homeowners if in-door noise levels exceeded the greater of 30 dBA or 5dBA above ambient.</li> </ul>
Granite Reliable	<ul style="list-style-type: none"> <li>No noise standards</li> </ul>
Groton Wind	<ul style="list-style-type: none"> <li>Daytime: Not to exceed 55 dBA or 5 dBA above ambient, whichever is greater.</li> <li>Nighttime: Not to exceed 45 dBA or 5 dBA above ambient, whichever is greater.</li> <li>Campground: Not to exceed 40 dBA or 5 dBA above ambient, whichever is greater.</li> </ul>
Antrim Wind	<ul style="list-style-type: none"> <li>Daytime: Not to exceed 45 dBA or 5 dBA above ambient</li> <li>Nighttime: Not to exceed 40 dBA or 5 dBA above ambient</li> </ul>

Rick James has recommended that the SEC adopt a relative noise limit of 10 decibels above the background level with a noise cap not to exceed 45 dB(A)<sub>(fast)</sub>. The overall cap is to account for a possible cumulative impact of multiple projects sited near each other. In contrast, Ken Kaliski recommended an absolute sound limit (for example an overall turbine cap of 40 dB(A) or 45 dB(A) Leq 1-hour). Others within the group argued that a 'not to exceed' limit be established and measured at the property lines.

The question of low-frequency noise and infrasound was briefly discussed. In general, the group recognized that the topic of audible sound is more defined and an area where rules could more readily be developed.

Appendix C.4 provides some references on noise limits including infrasound.

## 2. Key Findings - Shadow Flicker

Wind turbines can create a visual phenomenon known as shadow flicker which is defined as the alternating change in light intensity or shadows created by the moving turbine blades when back-lit by the sun. The location and occurrence of the shadowing effect depends on the time of year, time of day and the position of the sun in the sky<sup>2</sup>. The frequency of shadow flicker is related to the rotational speed of the blades. See Appendix C.2 for background information on shadow flicker.

The State of New Hampshire has not adopted any rules regarding shadow flicker, however, international standards do exist which are often cited.

German Limit<sup>3</sup> -

- Shadow flicker at residences, learning spaces, workplaces, and health care settings cannot exceed 30 minutes/day or 30 hours/year for **astronomical maximum** shading duration;

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<sup>2</sup> There was some discussion within the work group on whether moon light could create the same shadowing effect. No formal evidence was available to suggest moon flicker is a problem.

<sup>3</sup> Minnesota Department of Commerce: Energy Facility Permitting (2011) International Review of Policies and Recommendations for Wind Turbine Setbacks from Residences: Setbacks, Noise, Shadow Flicker, and Other Concerns. Retrieved from [http://mn.gov/commerce/energyfacilities/documents/International\\_Review\\_of\\_Wind\\_Policies\\_and\\_Recommendations.pdf](http://mn.gov/commerce/energyfacilities/documents/International_Review_of_Wind_Policies_and_Recommendations.pdf).

- Actual permitted amounts of shadow flicker at sensitive locations cannot exceed 8 hours/year;
- If setback distances are not sufficient in meeting these limits, mitigation methods are required which may include curtailing turbine operation until the flicker period ends.

Danish limit<sup>4</sup> -

- actual limits: 10 hours per year.
- If shadow flicker exceeds the maximum recommended amount, project owner may be required to curtail operation when shadow flicker might occur.

The best opportunity for avoiding and minimizing shadow flicker is during project design. But if this is not possible, or if the problem of shadow flicker arises after the project is operational, technology is available that can sense when the problem will occur, (turbine by turbine) and automatically curtail the unit until the sun moves out of position.

## 2.1. Areas of Agreement

The work group members generally agreed that shadow flicker could prove to result in an unreasonable adverse effect if not limited. It is difficult to fully assess the areas where agreement was reached since much of the time spent in meetings involved understanding the nature of the problem. Table 2.a provides an initial level of agreement.

**Table 2.a**

SHADOW FLICKER	
1.	Applications for wind energy facilities shall include shadow flicker assessments.
2.	Shadow flicker assessments shall identify the astronomical maximum (worst case) and anticipated hours per year of shadow flicker for each residence, learning space, workplace, health care setting, public gathering area (outdoor and indoor), and roadway that falls within the study area.
3.	Shadow flicker at residences, learning spaces, workplaces, health care settings, public gathering areas (outdoor and indoor) shall be limited.
4.	If Shadow Flicker limits cited under rule 3 cannot be met via project layout and setback distances, curtailment technology or other mitigation tools may be considered.

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<sup>4</sup> Danish Energy Agency. (2009). Wind turbines in Denmark. Retrieved from <http://www.ens.dk/da-dk/Sider/forside.aspx>



## 2.2. Areas Without Agreement

Although the work group members generally agreed that shadow flicker could prove to be an issue, we did not reach consensus on the number of hours per year or minutes per day that a non-participating property owner could be subject to shadow flicker before the project would create an unreasonable adverse effect.

At least one member argued that since no known complaints of shadow flicker have been reported in New Hampshire, a 30-hour per year threshold, which is the limit most often seen at projects throughout the United States, would be appropriate (see discussion on Appendix C.2 to understand the origin of the 30-hour limit). Others made the case that even though complaints have not been filed, we should be planning for future applications.

There was also no agreement within the group regarding the distance at which turbine shadow flicker posed a problem.

## 2.3. Alternative Proposals for Areas Without Agreement

Table 2.b provides alternative positions offered by the work group participants on areas where agreement could not be reached.

**Table 2.b**

SHADOW FLICKER - Alternative Proposals for Areas Without Agreement	
Distance at which Shadow Flicker is a problem	<ul style="list-style-type: none"><li>• 10x rotor diameter width</li><li>• One mile (5280 feet)</li><li>• 6200 feet as recorded in Mason County Michigan</li><li>• Do not establish any distance. Assume SF it is a problem at any distance.</li></ul>
Maximum hours per year of SF at residences, learning spaces, workplaces, health care settings, public gathering areas (outdoor and indoor), and roadways.	<ul style="list-style-type: none"><li>• 30 hours per year with a limit of 30-minutes per day</li><li>• German standard of 30-hour astronomical maximum per year with an actual number of 8 hours per year; limit of 30-minutes per day</li><li>• 0 hours per year. Given that technology exists that can eliminate shadow flicker by curtailing turbine operation, there seems no reason to permit even one minute of flicker beyond the project site.</li><li>• Whatever the limit, it should not apply to roadways.</li></ul>

## 2.4. Other General Comments

Table 2.c shows the results of the shadow flicker modeling submitted with the four wind energy applications reviewed by the SEC.

**Table 2.c**

<b>Project</b>	<b>Maximum hours of flicker per year at nearby properties</b>
<b>Lempster</b>	More than 30 hours/year for properties close to the turbines 10-20 hours per year for residential properties nearby
<b>GRP</b>	Turbines remote - no shadow flicker
<b>Groton</b>	1-3 hours per year for properties near the turbines
<b>Antrim</b>	10-22 hours per year for properties near the turbines

### **3. Key Findings - Safety setbacks Ice/Blade Throw, Turbine Collapse**

Safety setbacks from turbines are established to minimize the risk of property damage or injury resulting from ice throw or component failure. Setbacks are often defined as multiples of total turbine height (tower base to the upper tip of the blade in the 12 o'clock position) and measured from different points including property lines, occupied buildings, roads or public gathering areas.

The separate concept of a 'safety zone' around a turbine establishes an area of risk that is measured as the radius from the turbine base. Safety zones are appropriate when the turbines are sited long distances from buildings and roads, but in areas where the public might gather such as ski and hiking trails, hunting areas etc.

The State of New Hampshire has not adopted any rules regarding safety setback distances from turbines. See Appendix C.3 for more information on this issue.

### 3.1. Areas of Agreement

The work group members generally agreed that setback distances, or safety zones, were necessary to ensure the public is not placed at risk when in the vicinity of an operating turbine.

Table 3.a lists the areas of agreement.

**Table 3.a**

SAFETY ZONES - Ice/Blade Throw, Other Catastrophic Failure	
1.	Turbines shall be curtailed during periods of ice accretion.
2.	Turbine technology shall be implemented which will prevent ice accretion or operation during periods of ice accretion.
3.	The use of warning signs is required to alert anyone in the area of risk.
4.	Operational staff should be aware of the conditions likely to lead to ice accretion on the turbine and conduct visual inspections to ensure the turbines are not operating with ice on the rotor unit.
5.	A safety zone or setback distance shall be defined for each turbine.
6.	The SEC may reconsideration the size of the safety zone if the applicant submits a risk assessment that includes project-specific information and mitigations that will adequately protect the public.
7.	In no case shall safety zones encompass portions of non-participating properties, public roads or public gathering areas.

### 3.2. Areas Without Agreement

There were two areas of disagreement: the size of any setback distance or safety zone and whether visual inspections of the turbines shall be regularly conducted to ensure the turbines are not operating with ice on the units.

### 3.3. Alternative Proposals for Areas Without Agreement

Simple math describing motion shows that ice or debris from a 100-foot long blade can be thrown nearly 1700 feet from the base of the turbine. Distance is dependent on the length of the blade, the angle of the blade at the time of the incident, the speed of rotation and the vertical distance from the ground.

Several alternatives can be considered in establishing the size of a safety zone or setback distance as follows:

- Establish a fixed size safety zone as a multiple of rotor diameter widths (for example 5x the rotor diameter) that accounts for the larger turbines and the maximum mathematical distances that objects can be thrown.

- Determine the maximum mathematical distance that objects can be thrown from a spinning blade.
- Consider previous setback distances adopted by the SEC on prior decisions involving wind projects. See appendix C.3 for a table of setback distances at the Lempster, Granite Reliable and Groton Wind facilities.

### **3.4. Other General Comments**

The SEC must, by statute, make a determination as to whether a project presents an unreasonable adverse effect on public safety, however, determining the level of risk to the public where a project becomes unsafe is not an easy problem to solve. One member noted that establishing setback distances could result in significant land areas in the vicinity of a wind project being off-limits for safe public use.

## **4. Key Findings - Transmission Setbacks**

Magnetic fields are created from the flow of current through wires or electrical devices. As the current increases, so does the strength of the magnetic field as measured in units of milligauss (mG). The magnetic field level at 300 feet or more from a transmission line centerline should be similar to local ambient, or background levels.

There are no known causal links between power-line magnetic field (MF) exposure and demonstrated health effects, in particular with regard to some forms of childhood cancers. However, some studies show a weak association. Since science cannot prove a negative, magnetic fields cannot be proven to be entirely safe. At the same time, science has been unable to prove the positive either. It's for this reason that the debate persists.

The State of New Hampshire does not have specific rules regarding EMF levels at the edge of transmission rights-of-way (ROW) nor are there federal standards for limiting transmission line EMF. Other states, however, have tackled this issue beginning in the 1980's and 90's at a time when utilities were undertaking substantial power line build-out. Several states enforce firm limits on EMF while others have adopted siting constraints and/or reporting rules around EMF levels. A policy of 'Prudent Avoidance' crops up frequently in the literature. Under this policy, state agencies seek a reasonable balance between avoiding potential harm to humans and the associated costs and risks. See Appendix C.4 for a review of how different states are treating this matter when siting high voltage (HV) transmission lines.

## 4.1. Areas of Agreement

The topic of safety setbacks for HV transmission lines was the most contentious within the Health/Safety work group. Several participants held firm that human exposure to electromagnetic fields (EMF) emanating from HV power lines is a concern, particularly for children, while others insisted that numerous studies have repeatedly demonstrated that EMF is not a public health risk. The dispute within the group was representative of the broader debate nationwide where, after more than three decades of research, concerns still remain<sup>5</sup>.

## 4.2. Areas Without Agreement

It is difficult to assess the level of agreement on this topic but some in the group at least agreed that the SEC consider requiring applicants to provide pre- construction and estimated post-construction EMF readings as part of the application process. In addition, there was some agreement that the number and types of buildings at specific distance categories be included in the application.

## 4.3. Alternative Proposals for Areas Without Agreement

Since the extent of agreement on this topic is uncertain, proposed rules are listed in Table 4.a. An alternative is to take no action relative to EMF.

**Table 4.a**

<b>TRANSMISSION LINE SAFETY (EMF) - Application requirements<sup>6</sup></b>	
1.	The number and type of each building within the following distance categories – as estimated from the centerline: 0-25 feet, 26-50 feet, 51-100 feet, 101-150 feet, and 151-300 feet. Types of buildings include homes, apartments, schools, daycare centers, hospitals, and commercial/ industrial buildings.
2.	Detailed magnetic field profiles for each unique structure type or circuit configuration (new and existing) with the exception of dead-end structures adjacent to substations.
3.	For routes that would affect existing electric lines, provide magnetic field profiles for the existing lines and a post-construction scenario that incorporates the new and the existing lines.
4.	For routes that would have multiple adjacent underground circuits, provide magnetic field profiles for each set of circuit configurations.

<sup>5</sup> California Department of Health Services and the Public Health Institute, Electric and Magnetic Fields retrieved at <http://www.ehib.org/emf/longfactsheet.PDF>

<sup>6</sup> Application rules derived from the State of Wisconsin PSC requirements. The State of Wisconsin has not established any limits on EMF levels or setback distances.

5.	<p>Estimated magnetic field data which includes:</p> <ul style="list-style-type: none"> <li>estimate for proposed lines at 80 percent and at 100 percent of peak load for one year post-construction and 10 years post-construction. For existing lines, use present day loadings to estimate the magnetic fields levels.</li> <li>provide expected current levels for 80 and 100 percent of peak load at one and ten years post-construction.</li> </ul>
6.	<p>Provide all assumptions used to model magnetic field levels including:</p> <ul style="list-style-type: none"> <li>Pole design diagram that includes the dimensions of pole arms, dimensions of conductor locations, horizontal distance from the pole to the conductors, and the distance of conductors from the ground at the pole.</li> <li>Height of lowest conductor(s) at mid-span.</li> <li>Depth from ground surface to circuits, for underground construction.</li> </ul>
7.	<p>The Application shall propose and implement where practicable, low-cost efforts to reduce EMF without compromising safety. Suggested mitigations may include but not be limited to:</p> <ul style="list-style-type: none"> <li>increase distance between the transmission line and the public's exposure to the magnetic fields;</li> <li>Increase height of transmission structures which would lower resulting exposure levels;</li> <li>bring lines closer together (<i>magnetic fields interfere with one another, producing a lower overall magnetic field level, too close could cause arcing between the lines</i>);</li> <li>bury transmission lines to reduce magnetic fields. (<i>Underground lines can be installed closer together and insulated with rubber, plastic, or oil.</i>)</li> </ul>

#### 4.4. Other General Comments

Appendix C.4 provides a brief summary of the rules adopted by other states on the topic of HV transmission siting and EMF. In addition to the EMF discussion, additional information was provided to the group covering the following transmission setback concerns:

- FERC recommendations<sup>7</sup> on setbacks for new transmission to the outside of the ROW.
- HUD guidelines<sup>8</sup> precluding buildings from being constructed within the "engineered" fall distance of a high voltage tower. HUD is tightening its lending and is requiring verification that the building is not within this fall distance.

<sup>7</sup> <http://www.nh.gov/oep/energy/programs/documents/sb99-setbacks-transmission-ferc.pdf>

<sup>8</sup> <http://www.hud.gov/offices/adm/hudclips/handbooks/hsg/4150.2/41502c2HSGH.doc>

## **Acknowledgements**

We are grateful for the tireless contributions of all of the work group members. Significant time was dedicated to this process on topics that turned out to be more complicated and more controversial than many expected. Special thanks to our invited experts who donated freely of their time to educate us and offer their advice. Thanks also go to meteorologist Dr. Fred Ward (and NH resident) who provided valuable insight and comment on something we all live with but few understand -- NH weather. Finally, thank you to the Advisory Council and Navigant for providing us the opportunity to be part of this important effort.

## References

### Appendix A: Group Members

Name (First, Last)	Role (Member/Moderator)	Affiliation (Town Resident, Company, Organization, Industry, etc.)
Lisa Linowes	Member/Moderator	Windaction.org
Tripp Blair	Member	Bridgewater resident
Edward Dekker	Member	New Ipswich resident
Elizabeth Freeman	Member	New Ipswich resident
Larry Goodman	Member	Hebron resident
Jack Kenworthy	Member	Eolian Renewables
Lori Lerner	Member	Bridgewater resident
Campbell McLaren	Member	Easton resident, MD
Tom Mullen	Member	Campton resident
Mike Novello	Member	Wagner Forestry
Donald Pfundstein	Member	Gallagher, Callahan & Gartrell
Francis Pullaro	Member	Renew NE
Derek Rieman	Member	EDP Renewables
Susan Schibanoff	Member	Easton resident
Stuart Smith	Member	Grafton Energy
Ken Sullivan	Member	Temple resident
Fred Ward	Member	Meteorologist
Ric Werme	Member	Resident
Joe Wilkas	Member	Resident

### Appendix B: Group Meeting/Conference Call Dates & Notes

Date	Focus	Guest Attendees
April 25*	Noise emissions	Acoustician Richard James
May 5*	Noise emissions	Acousticians Richard James, Stephen Ambrose and Edward Duncan
May 9*	Shadow Flicker, Debris throw, Transmission	Cary Shineldecker and William Palmer
May 13	Predictive modeling for noise	Acousticians Richard James, Stephen Ambrose and Ken Kaliski
May 23	Shadow Flicker, Debris throw, Transmission	Cary Shineldecker and William Palmer
June 3*	Noise emissions, Transmission	Acousticians Richard James, Ken Kaliski and Edward Duncan
* = call was recorded		



## Appendix C: Relevant Documents and Materials

### C.1 Wind Turbine Noise Studies

**Pre-construction baseline or background noise survey:** The purpose of the baseline sound survey is to quantify the existing background sound levels at surrounding land uses to define the existing soundscape around the project area. The existing soundscape is not adequately described by one acoustical metric, but by a number of acoustical metrics including: the equivalent continuous sound pressure level (Leq), statistical sound levels (e.g. L90, L50, L10), and maximum and minimum levels. The baseline sound survey should also include descriptions of the types of natural and anthropogenic sounds that are present in the existing environment.

**Predictive modeling:** The purpose of predictive modeling as defined under ISO 9613-2 specifies the engineering method for calculating the attenuation of sound during propagation outdoors in order to predict the levels of environmental noise that will be introduced into a community after a wind project is constructed. The model is suitable for predicting propagation under well-developed moderate ground-based temperature inversions, such as commonly occurs on clear, calm nights or under moderate downwind conditions. Inversion conditions over water surfaces are not covered and may result in higher sound pressure levels than predicted with the model.

**Post-construction compliance monitoring:** The purpose of compliance monitoring is determine whether noise emissions from the operating project are within permitted limits.

### C.2 Background information on Shadow Flicker

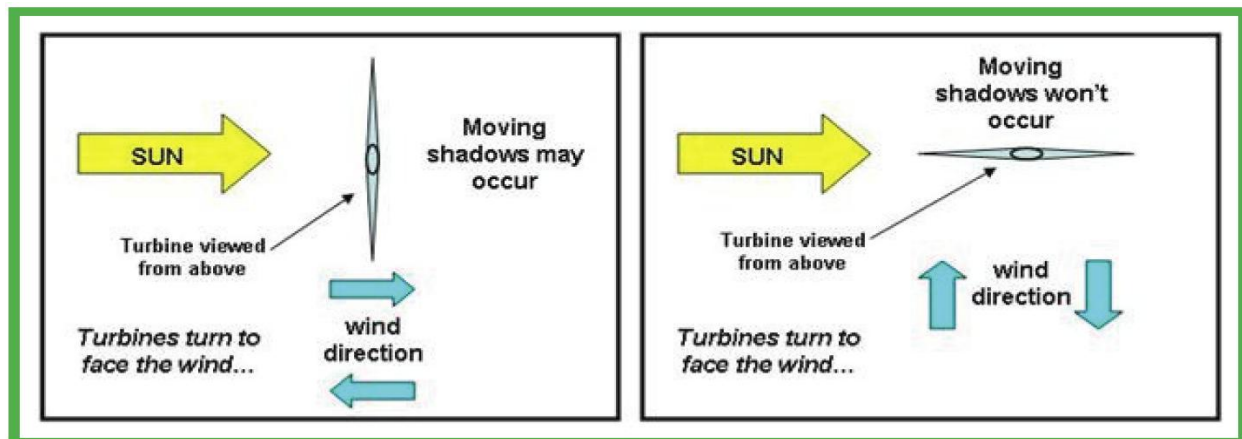
Shadow flicker occurs at all times when the turbines are rotating and there is a visible solar disk.

As the sun moves in the sky, the direction the shadows are cast and how far they are cast changes constantly. When the sun is high in the sky the area being flickered is very close to the turbine, but when the sun is lower in the sky, which is most of the daytime, the flickered area extends out many times the total height of the turbine.

The intensity of the flicker depends on the intensity of the sun and the amount of the (apparent) solar disk which the blade covers as it rotates in front of the disk.

Commercial products are available that can model the number of hours per year of shadow flicker an operating wind energy facility will produce at various locations based on the placement of the turbines. The three products most commonly cited are WindPRO, WindFarm and Windfarmer. The output of these packages does not vary significantly. All computer models produce the worst conditions referred to as the "astronomic worst case scenario". The worse case is the theoretical maximum number of hours that shadow flicker will be produced at a location assuming:

1. The sun is shining all day from sunrise to sunset;
2. The rotor-plane of the turbine is always perpendicular to the sun;
3. The turbine is always operating.



Upon determining the worst case scenario, average meteorological conditions for the project site are applied in order to model a more realistic estimate for the number of hours of flicker.

When the sun is close to the horizon (3-degree angle) or as distance increases between an observer and the turbine, it's expected that light diffuses thereby reducing the appearance of the harsh shadows cast by the blades. There is also a greater potential for obstruction by trees, topography, buildings. However, the density and length of the shadows may be more pronounced when the turbine is situated on a ridgeline several hundred feet above the impacted properties. In this scenario, the sun may be high in the sky but still be positioned behind the spinning blades.

Shadow flicker modeling, in general, assumes a maximum impact distance of 10-rotor diameters which for a 100-meter (328 feet) rotor diameter, shadows would be expected to fully dissipate after 3280 feet.

The work group heard from Cary Shineldecker of Mason County, Michigan. Mr. Shineldecker's home is located within Consumers Energy's Lake Winds Energy Park, a 100.8 megawatt facility consisting of 56 Vestas V100 1.8-megawatt turbines each standing 476 feet tall and with a 100-meter rotor diameter. Five turbines are within ½ mile of his home, 13 turbines within 1 mile and 26 turbines within 1.5 miles. *(see photo on this page)*

Consumers Energy conducted a shadow flicker analysis prior to construction. The study predicted an astronomical worst case of 48.8 hours of flicker per year on Shineldecker's home. Using average weather patterns and anticipated cloud cover, this figure was further refined to a more realistic limit of 6.8 hours per year. The project went online Thanksgiving weekend, 2012. Within 4 weeks shadow flicker at his home exceeded the 6.8 hours and shortly after exceeded the 10 hour/year limit set in the county ordinance.

The inaccuracies in the modeled results, in part, were tied to the assumption that shadows would not cast beyond 10-rotor diameter widths. This standard may have been appropriate for shorter blades, however, the longer, wider blades on today's machines and different shadow profiles for different blade shapes (manufacturer dependent) suggest the 10-rotor limit may not be appropriate. Shineldecker recorded substantial flicker on, and in, his home from a turbine located 5400' away. Mason County's Zoning and Building department independently measured flicker at distances beyond 6000 feet or 18+ rotor diameters<sup>9</sup> away.

The table below shows the results of the shadow flicker modeling submitted with the four wind energy applications reviewed by the SEC.

<b>Project</b>	<b>Maximum hours of flicker per year at nearby properties</b>
<b>Lempster</b>	More than 30 hours/year for properties close to the turbines 10-20 hours per year for residential properties nearby
<b>GRP</b>	Turbines remote - no buildings nearby
<b>Groton</b>	1-3 hours per year for properties near the turbines

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<sup>9</sup> Reilly, Mary, Mason County Zoning and Building Director. Shadow Flicker Monitoring  
<http://www.masoncounty.net/userfiles/filemanager/414/>

<b>Antrim</b>	10-22 hours per year for properties near the turbines
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## **International Standards**

The State of New Hampshire has not adopted any rules regarding shadow flicker, however, there are international standards that provide important guidance.

Germany's shadow flicker limits are referred to in a large number of government and wind energy association documents worldwide, however, there is considerable confusion about the actual regulations. It is common to see the 30-hour limit codified in ordinances across the United States. However, Germany's 30-hour limit, again, refers to the astronomical maximum figure while the more realistic maximum of 8 hours per year is permitted at homes and places where people work, learn, and gather.

## **Mitigating for Shadow Flicker**

The best opportunity for avoiding and minimizing shadow flicker is during project design. But if this is not possible, or if the problem of shadow flicker arises after the project is operational, as was the case in Mason County, technology is available that can sense when the problem will occur, (turbine by turbine) and automatically curtail the unit until the sun moves out of position.

In Mason County, the Zoning and Building Director initiated an enforcement proceeding after Cary Shineldecker was able to demonstrate that his home was subject to shadow flicker in excess of the 10-hours permitted by law. According to Shineldecker, the turbines operating out of compliance were later equipped with the Vestas Shadow Detection System (VSDS)<sup>10</sup>, developed by Vestas and the problem of shadow flicker has been eliminated.

VSDS consists of two light intensity sensors mounted on the east and west sides of the offending turbine. A difference in the light intensity readings at each sensor acts as an indicator that shadowing will occur (*see figure below*). A controller integrated into the unit tracks the shadow flicker conditions at each impacted property. If the controller determines that a turbine is encroaching on the annual hour limit allowed, which for Mason County would be 10 hours per

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<sup>10</sup>

<http://www.lakewindsenergypark.com/Uploadedfiles/Lakewinds/SHADOW%20FLICKER%20MONITORING%20AND%20MITIGATION%20INFORMATION.pdf>

year at a residence, the turbine is stopped and remains off until the period of shadow flicker is over.

### C.3 Background information on Safety Setbacks (Ice/Debris/Blade Throw)

Ice throw, blade failures, and turbine collapse can result in turbine debris being flung considerable distances from the turbine base, especially on hills and ridges with updrafts.

**Ice Throw:** Project developers often represent that operating wind turbines are equipped to sense any imbalance in the system due to ice build-up and shut-down, however, this is not always the case. According to Seifert et.al<sup>11</sup>:

*"There is significant evidence that rime ice continues to form when the turbine is operating and is not shaken off by blade flexing, even though this may be the case for other types of ice formation. Also, rime ice formation appears to occur with remarkable symmetry on all turbine blades with the result that no imbalance occurs and the turbine continues to operate."*

GE Wind<sup>12</sup> states that rotating turbine blades may propel ice fragments up to several hundred meters if conditions are right depending on turbine dimensions, rotational speed and many other potential factors.

Estimates of icing risk are also reliant on the number of days in a year when ice events might occur. In colder climates, icing can occur during non-winter months.

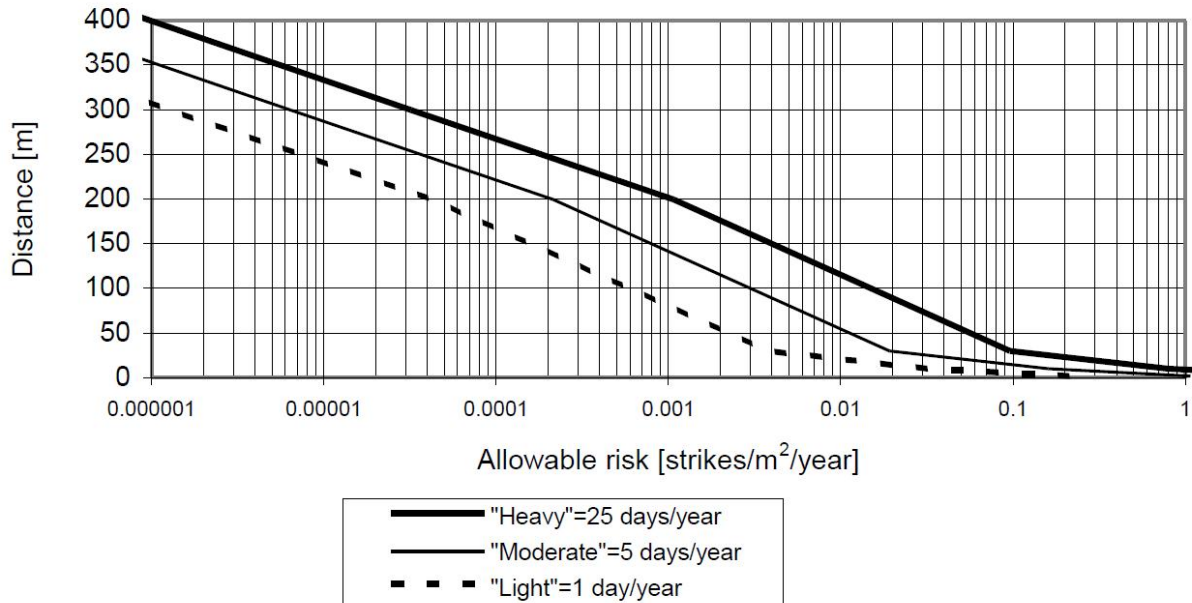
According to meteorologist Fred Ward, there is a lack of icing data for elevated structures on hills and ridges in New Hampshire other than for Mount Washington. Rime icing is elevation dependent and there may be additional effects due to wind flow over isolated peaks. As more turbines are sited in cold climates, the wind industry has considered safety distances based on the level of allowable risk. The figure below maps safety distances from the turbines based on

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<sup>11</sup> Morgan C., Bossanyi E., Seifert H., "Assessment of Safety Risks Arising From Wind Turbine Icing" 31 March - 2 April 1998, Hetta, Finland [http://arcticwind.vtt.fi/boreasiv/assessment\\_of\\_safety.pdf](http://arcticwind.vtt.fi/boreasiv/assessment_of_safety.pdf)

<sup>12</sup> [http://site.ge-energy.com/prod\\_serv/products/tech\\_docs/en/downloads/ger4262.pdf](http://site.ge-energy.com/prod_serv/products/tech_docs/en/downloads/ger4262.pdf)

the estimated annual icing events at the project site and degree of risk.



Very little public information is available that documents the frequency of ices throw and the distances flung from the turbines. Surveys have been conducted of large project operators in an effort to track the size and distance of ice fragments being thrown but the results are inconclusive as there is no way to assess how well the area around the turbines was searched, especially at great distances from the towers.

**Component Failure:** Turbines are complex machines that can fail. Total collapse and blade shred/shear are two examples. In any case, components of the turbine can be thrown a distance from the turbine base. It is more difficult to assess the problem as it depends on the type of failure. Turbine manufacture, Vestas, has reported debris thrown from its V90 turbine 1,600 feet<sup>13</sup>.

Simple math<sup>14</sup> describing motion shows that ice or debris from a 100-foot long blade can be thrown nearly 1700 feet from the base of the turbine. Distance is dependent on the length of the blade, the angle of the blade at the time of the incident, the speed of rotation and the vertical distance from the ground.

<sup>13</sup> Jensen, Chris NHPR *Expanding Balsams Ski Resort Money Jobs And Regulatory Challenge* retrieved at <http://nhpr.org/post/expanding-balsams-ski-resort-money-jobs-and-regulatory-challenge>

<sup>14</sup> Matilsky, Dr. Terry Windmills: Basic Kinematics retrieved at <http://xray.rutgers.edu/~matilsky/windmills/throw.html>

The certificates for the three operating wind facilities in New Hampshire, Lempster Wind, Granite Reliable Power (GRP) and Groton Wind, impose different safety distances. In the case of GRP, the SEC defined a safety zone around the turbines. For Lempster Wind and Groton Wind, actual setback distances were defined in the respective town agreements and subsumed into the certificate.

Project	Distance to property line	Distance to occupied building	Distance to public roads	Notes
Lempster	1.1x height	3x height	1.5x height	Town agreement
GRP	--	--	--	1300-foot <sup>15</sup> safety zone around the turbines; public discouraged
Groton	1.1x height	3x height	1.5x height	Town agreement; 524-foot safety zone for Iberdrola employees

Mr. William K. Palmer, a utility reliability engineer responsible for analyzing the impact on public safety at a nuclear facility in Ontario Canada explained to the work group the importance of assessing risk of injury/damage from a deterministic perspective. As a general rule, deterministic risk assessments require the analyst to assume that a person is permanently standing at the limit of risk (edge of the safety zone), and is considered to be there during the accident. Thus, a deterministic risk assessment for a wind turbine will determine an effective mitigation safety zone that prevents a member of the public from wandering into the zone of accident impact.

## C.4 Background information on Transmission Siting and EMF

Different states have taken different approaches regarding EMF when siting large transmission projects. The following paragraphs briefly detail how some address EMF exposure when siting lines greater than 69kV<sup>16</sup>.

<sup>15</sup> *Mechanical Operating and Maintenance Manual* for the Vestas V90 3.0MW turbine which defines a "radius of 400m (1300 ft) from the turbine" as necessary to ensure safety. Vestas has since removed this reference in the manual. The company now states that responsibility for public safety lies with the permitting bodies.

## Massachusetts

The Commonwealth of Massachusetts has defined an edge-of-ROW level of 85 mG as a benchmark for comparing different design alternatives. Although a ROW-edge level in excess of this value is not prohibited, it may trigger a more extensive review of alternatives.

## New York<sup>17</sup>

New York has a policy that requires transmission lines to be designed, constructed and operated so that magnetic fields at the edges of the ROW will not exceed 200 mG.

## Florida<sup>18</sup>

Florida limits magnetic fields at the edge of the ROW to 150 mG for transmission lines with voltages of 69 kV through 230 kV. For lines greater than 250 kV, the limit is 200 mG. Double-circuited 500 kV lines and lines greater than 500 kV may not exceed 250 mG, also at the edge of the ROW.

## Wisconsin<sup>19</sup>

Wisconsin has not set hard limits on EMF levels but the state has taken the position that the public has a right to know details about EMF levels. The application process requires project proponents to provide the following information:

- a) number and type of each building within the following distance categories – as estimated from the centerline: 0-25 feet, 26-50 feet, 51-100 feet, 101-150 feet, and 151-300 feet. Types of buildings include homes, apartments, schools, daycare centers, hospitals, and commercial/ industrial buildings.
- b) detailed magnetic field profiles for each unique structure type or circuit configuration (new and existing) with the exception of dead-end structures adjacent to substations.

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<sup>16</sup> It's important to note that EMF is directly tied to the amount of current flowing through a line. Lower capacity lines (69 kV) can show high levels of EMF while some 115kV lines may have lower levels of EMF.

<sup>17</sup> State of New York Public Service Commission, *Statement of Interim Policy on Magnetic Fields of Major Electric Transmission Facilities, Cases 26529 and 26559*, Issued and Effective September 11, 1990.

<sup>18</sup> Florida Administrative Code 62-814.450.

<sup>19</sup> <http://psc.wi.gov/utilityinfo/electric/construction/documents/transmissionLineAFR.pdf>



c) for routes that would affect existing electric lines, provide magnetic field profiles for the existing lines and a post-construction scenario that incorporates the new and the existing lines.

d) for routes that would have multiple adjacent underground circuits, provide magnetic field profiles for each set of circuit configurations.

e) estimated magnetic field data which includes:

- estimate for proposed lines at 80 percent and at 100 percent of peak load for one year post-construction and 10 years post-construction. For existing lines, use present day loadings to estimate the magnetic fields levels.
- provide expected current levels for 80 and 100 percent of peak load at one and ten years post-construction.

f) Provide all assumptions used to model magnetic field levels including:

- Phase ID and angles.
- Pole design diagram that includes the dimensions of pole arms, dimensions of conductor locations, horizontal distance from the pole to the conductors, and the distance of conductors from the ground at the pole.
- Height of lowest conductor(s) at mid-span.
- Depth from ground surface to circuits, for underground construction.

This information is then available to the public and considered by the Commission in its route selection decisions. In some respects, EMF exposure has become a proxy for property value impact.<sup>20</sup>

## California<sup>21, 22</sup>

The California Department of Education requires minimum distances between new schools and the edge of transmission line rights-of-way. The setback guidelines are: 100 feet for 50-133 kV

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<sup>20</sup> Kenneth Rineer, personal communication with L. Linowes June 2, 2014).

<sup>21</sup> Electric And Magnetic Fields Measurements And Possible Effect On Human Health — What We Know And What We Don't Know In 2000 <http://www.ehib.org/emf/longfactsheet.PDF>

<sup>22</sup> California Department of Education Power Line Setback Exemption Guidance, May 2006. <http://www.cde.ca.gov/ls/fa/sf/powerlinesetback.asp>

lines, 150 feet for 220-230 kV lines, and 350 feet for 500-550 kV lines. These limits are not based on specific biological evidence, but on the rationale that the electric field drops to background levels at the specified distances.

The California Public Utilities Commission (CPUC), recommends that state investor owned utilities carry out “no and low cost EMF avoidance measures” in construction of new and upgraded utility projects. This means that 4% of the total project cost is allocated to mitigation measures if these measures will reduce magnetic field strength by at least 15%.

### **Connecticut<sup>23</sup>**

The Connecticut Siting Council adopted a precautionary policy, in place since 1993, which includes establishing a standard method to allocate funds for MF mitigation. The Council follows California’s cost allotment strategy for no-cost/low-cost MF mitigation of 4% total project cost is to help reduce magnetic field strength by at least 15%.

As part of the application process, proponents are required to provide design alternatives and calculations of MF for pre-project and post-project conditions, under 1) peak load conditions at the time of the application filing, and 2) projected seasonal maximum 24-hour average current load on the line anticipated within five years after the line is placed into operation.

MF values are to be calculated from the ROW centerline out to a distance of 300 feet on each side of the centerline, at intervals of 25 feet, including at the edge of the ROW at 1 meter above ground level. Calculations shall assume “all lines in” and projected load growth five years beyond the time the lines are expected to be placed into operation, and shall include changes to the electric system approved by the Siting Council and the ISO-NE.

The applicant must also provide the locations of, and anticipated MF levels encompassing, residential areas, private or public schools, licensed child day care facilities, licensed youth camps, or public playgrounds within 300 feet of the proposed transmission line.

### **Vermont<sup>24</sup>**

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<sup>23</sup> Electric and Magnetic Field Best Management Practices For the Construction of Electric Transmission Lines in Connecticut December 14, 2007 [http://www.ct.gov/csc/lib/csc/emf\\_bmp/emf\\_bmp\\_12-14-07.doc](http://www.ct.gov/csc/lib/csc/emf_bmp/emf_bmp_12-14-07.doc)

<sup>24</sup> Position Paper On Electric And Magnetic Power Frequency Fields And The Velco Northwest Vermont Reliability Project. Vermont Department Of Health December 15, 2003

The State of Vermont<sup>25</sup> Department of Health has adopted the policy of prudent avoidance as initially outlined in the state's Twenty Year Electric Plan (1994) in order to mitigate EMF exposure. Taking no action, according to the department, would not be commensurate with the evidence that some risk may exist.

### **World Health Organization<sup>26</sup>**

The World Health Organization position on EMF resembles that of states which have adopted a no-cost/low-cost MF mitigation policy. The following text is taken from the WHO's guidance on EMF:

- Government and industry should monitor science and promote research programmes to further reduce the uncertainty of the scientific evidence on the health effects of ELF field exposure. Through the ELF [extremely low frequency] risk assessment process, gaps in knowledge have been identified and these form the basis of a new research agenda.
- Member States are encouraged to establish effective and open communication programmes with all stakeholders to enable informed decision-making. These may include improving coordination and consultation among industry, local government, and citizens in the planning process for ELF EMF-emitting facilities.
- When constructing new facilities and designing new equipment, including appliances, low-cost ways of reducing exposures may be explored. Appropriate exposure reduction measures will vary from one country to another. However, policies based on the adoption of arbitrary low exposure limits are not warranted.

Aside from the public health question, establishing siting rules regarding EMF levels may limit undue delay when considering transmission applications before the SEC.

Consider SEC docket DSF 85-155<sup>27</sup> from September, 1986 where the SEC reviewed Hydro Quebec's application to construct a 140-mile DC transmission line through the state. After seventeen days of hearings and extensive cross-examination of five expert witnesses on the

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<sup>25</sup> <http://healthvermont.gov/enviro/rad/documents/VELCOtestimony.pdf>

<sup>26</sup> Electromagnetic fields and public health. World Health Organization (June 2007) <http://www.who.int/peh-emf/publications/facts/fs322/en/>

<sup>27</sup> [http://www.nhsec.nh.gov/1985/documents/091686\\_findings.pdf](http://www.nhsec.nh.gov/1985/documents/091686_findings.pdf) - Hydro Quebec's application to construct a 140-mile DC transmission line through the state

topic of public health, the SEC found that no health impact but also agreed to the stipulations prepared by the parties which included, in part:

- New England Hydro shall conduct studies related to existing ambient static electric and magnetic fields and ion level monitoring shall be performed for a period equal to at least 1 full year prior to energizing of the line; Studies of ambient air ion levels and static electric and magnetic field concentrations shall be conducted for a period of no less than 2 consecutive years;
- New England Hydro shall undertake an investigation of the feasibility of a long-term epidemiological study. The Company is obligated to conduct the human epidemiological study should it be deemed feasible by the Site Evaluation Committee and the Public Utilities Commission upon such terms and conditions as they deem advisable.

## C.5 Other References

Shepherd, Daniel, Hanning, Chris, Thorne, Bob *Noise: Windfarms*, 2012

Taylor, Dr. Sarah *Report on the Health Impacts of Wind Farms Shetland 2013 Summary* 2013

Thorne, Bob Thorne, Nissenbaum, Dr. Michael A, Aramini, Jeffery J, and Hanning, Christopher D. *Effects Of Industrial Wind Turbine Noise On Sleep And Health* 2013

<http://www.noiseandhealth.org/article.asp?issn=1463-1741;year=2012;volume=14;issue=60;spage=237;epage=243;aualast=Nissenbaum>

Schomer, Dr. Paul Schomer: *Comments On Recently Published Article, "Concerns About Infrasound From Wind Turbines* Oct 2013

<http://scitation.aip.org/deliver/fulltext/asa/journal/atdy/9/4/1.4827009.pdf?itemId=/content/asa/journal/atdy/9/4/10.1121/1.4827009&mimeType=pdf&containerItemId=content/asa/journal/atdy>

Schomer, Dr. Paul and Pamidighantam, Pranav *A Critical Analysis Of: Wind Turbine Health Impact Study: Report Of Independent Expert Panel* 2013

Salt, Dr. Alec N. and Lichtenhan, Dr. Jeffery T. *How Does Wind Turbine Noise Affect People?* 2014 <http://scitation.aip.org/content/asa/journal/atdy/10/1/10.1121/1.4870173>

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[http://arcticwind.vtt.fi/boreasiv/assessment\\_of\\_safety.pdf](http://arcticwind.vtt.fi/boreasiv/assessment_of_safety.pdf)

## **NH OEP SB 99 Pre-Rulemaking Process**

### **Wildlife, Rare Plants, and Natural Communities**

#### **Executive Summary**

The objectives of the Wildlife, Rare Plants, and Natural Communities subgroup were to identify what specific topics should be addressed in the category of “natural environment” and to provide guidance to SEC on definitions, application requirements, siting criteria, and other considerations pertaining to those topics. The group held four work sessions between 28 April and 5 June 2014 and addressed the following topics:

- Definitions
- Application Requirements
- Cumulative Impact
- Mitigation and Adaptive Management
- Study Protocols

General agreement was reached on definitions of natural resources which the working group determined were important to include in the SEC rules, pertaining to wildlife, rare plants and natural communities. It was also agreed that wetland and water quality are adequately addressed by existing NH Department of Environmental Services permitting programs, and do not need to be duplicated in the SEC rules. It was agreed that applicants should submit documentation that they have consulted with the appropriate state agencies regarding wildlife and rare plants, studied these resources following standard protocols, and assessed the potential effects of their project on wildlife, rare plants, and exemplary natural communities. Specific study protocols should not be included in the SEC rules, but should be developed by the resource agencies. It was further agreed that the SEC should consider the significance, extent, duration, and nature of project effects on natural resources, both positive and negative, in their determination of unreasonable adverse effects. The issue of cumulative impacts was also considered too complex to be adequately addressed by this working group during the pre-rule-making process, but deserves attention by resource experts during the rule-making process.

No general agreement was reached on the definition or implementation of cumulative impact assessment for natural resources, and no alternatives were suggested. Several alternative proposals for defining and addressing adaptive management and mitigation were proposed, with no agreement on the details. Several alternatives for specifying the agencies and resource experts that each applicant should consult with for input on wildlife and plant issues were suggested, as well as possible mechanisms to document agency approval of pre-application studies, without full agreement. Several options for siting criteria specific to wind energy projects were also discussed, without consensus on the details. The group reached general agreement on the majority of definitions, while recognizing that wording changes may occur during the rule-making process.

## Work Summary by Topic

### Key Findings on Definitions

#### 1.1 Areas of Agreement

The group achieved general agreement on the following definitions:

- “Rare plant” means any species included on the most recent version of the “Rare Plant List for New Hampshire” maintained by the New Hampshire Natural Heritage Bureau.
- “Natural community” means a recurring assemblage of plants and animals found in particular physical environments as classified in the New Hampshire Natural Heritage Bureau publication *Natural Communities of New Hampshire*. Rare natural communities are those ranked S1 (critically imperiled), S2 (imperiled) or S3 (very rare and local). Exemplary natural communities are rare natural community types and high quality examples of more common community types, as determined by the NH Natural Heritage Bureau.
- “Wildlife” means, as defined under NH RSA 207.1, XXXV, “all species of mammals, birds, fish, mollusks, crustaceans, amphibians, invertebrates, reptiles or their progeny or eggs which, whether raised in captivity or not, are normally found in a wild state.”
- “Significant wildlife species” means 1) any species listed as Threatened or Endangered, or which is a candidate for such listing, by the U.S. Fish and Wildlife Service; or 2) any species listed as Threatened, Endangered or Special Concern by the New Hampshire Department of Fish and Game.
- “Significant habitat resource” means habitat used by a species for critical life cycle functions. (For example, raptor nest sites, mammal denning sites, localized food resources, and bat maternity colonies and hibernacula.)

#### 1.2 Areas Without Agreement

The group did not achieve agreement on definitions for cumulative impacts, best practical mitigation, or adaptive management.

#### 1.3 Alternative Proposals for Areas Without Agreement

- Alternative 1) “Best practical mitigation” means methods or technologies used during construction or operation of an energy development that control or reduce to the lowest feasible level impacts to aesthetics, historic sites, air and water quality, the natural environment, and public health and safety.

- Alternative 2) "Best practical measures to avoid, minimize, or mitigate adverse effects" means methods or technologies used during siting, design, construction, operation, or decommissioning of an energy development that control or reduce adverse effects to the lowest practicable level.

One area of disagreement regarding a definition of adaptive management revolved around the respective roles of the SEC and pertinent state and federal agencies. The following definitions reflect two potential alternative approaches.

- Alternative 1) "Adaptive management" means a process by which pertinent state and federal agencies can recommend to the SEC appropriate mitigation measures to address unanticipated problems that arise during operations of an energy facility.
- Alternative 2) "Adaptive management" means a process by which unanticipated problems that arise during operations of an energy facility can be addressed through consultation between facility operators and pertinent state and federal agencies.

## 1.4 Other General Comments

Legislation passed this week (4 June) mandates that the Site Evaluation Committee address "cumulative impacts to natural, scenic, cultural, and recreational resources from multiple towers or projects or both" in rule-making relative to siting of wind energy systems. The working group has not had time to discuss how to address cumulative impacts in light of this legislation, which has not yet been signed. While the new law specifically addresses wind energy facilities, the SEC may decide whether or not to apply cumulative impacts analysis to other types of energy projects. Crafting a workable definition for cumulative impacts under this law will require input from individuals with expertise in the four resource areas specified.

## 2.0 Key Findings on Application Requirements

### 2.1 Areas of Agreement

Five participating members of the group achieved general agreement on the following application requirements:

- The applicant shall include documentation summarizing communications with natural resource agency personnel and other natural resource professionals.

- The applicant shall include a copy of an information request to the N.H. Natural Heritage Bureau regarding known or potential occurrences of rare, threatened, and endangered plants and exemplary natural communities in the project area; a list of rare, threatened, and endangered plants and exemplary natural communities potentially affected by the project; an assessment of potential effects on such plants and natural communities; and proposed mitigation measures for any adverse effects.
- The applicant shall include copies of information requests to the New Hampshire Fish and Game Department, and U.S. Fish and Wildlife Service, and N.H. Natural Heritage Bureau regarding known or potential occurrences of significant wildlife species in the project area; a list of significant wildlife species potentially affected by the project; an assessment of potential effects on such wildlife species; and proposed mitigation measures for any adverse effects.
- The applicant shall include a report, prepared by a qualified professional, identifying and describing any critical wildlife habitat (as designated by the U.S. Fish and Wildlife Service) and any significant habitat resources within the project area; a list of critical wildlife habitat and significant habitat resources potentially affected by the project; an assessment of potential effects on such habitats and habitat resources; and proposed mitigation measures for any adverse effects.
- Unless waived in writing by state and federal wildlife agencies, all applicants for a certificate shall conduct pre-application surveys for evidence of significant wildlife species following pertinent, available protocols recommended by state and federal wildlife agencies.

## 2.2 Areas Without Agreement

The group did not reach agreement regarding inclusion of the following application requirements.

## 2.3 Alternative Proposals for Areas Without Agreement

Alternative 1) Include: Studies to determine the impact of the facility on the natural environment shall be designed in consultation with the appropriate state and federal agencies, including but not limited to the N.H. Department of Environmental Services, the N.H. Department of Fish and Game, the N.H. Department of Resources and Economic Development, the N.H. Natural Heritage Bureau, and the U.S Fish and Wildlife Service.

Alternative 2) Omit above.



Alternative 1) Include: Applicants are encouraged to consult with other parties with relevant knowledge and expertise, including but not limited to municipal officials, non-governmental organizations, academic institutions and resource professionals, for input both on issues that need to be addressed by impact studies and on the appropriate methodology for conducting such studies.

Alternative 2) Omit above.

Alternative 1) All applicants for a certificate shall prepare a cumulative impacts assessment, in consultation with state and federal wildlife agencies, addressing the scope and scale of potential effects of the facility, in combination with other existing or proposed energy development, on populations of significant wildlife species.

Alternative 2) Omit above.

## 2.4 Other General Comments

The professional wildlife community, including representatives of academia, state and federal agencies, environmental consulting firms, and non-governmental organizations, needs to come together and discuss effective approaches to addressing cumulative impacts for significant wildlife species.

## 3.0 Key Findings on Siting Criteria

### 3.1 Areas of Agreement

The SEC shall consider the nature, significance, extent, and duration of a proposed project's effects on wetlands, water resources, rare plants, exemplary natural communities, and significant wildlife species in assessing a project's potential effect on the natural environment.

### 3.2 Areas Without Agreement

The group did not reach agreement regarding inclusion of the following siting criteria. The lack of agreement reflects minimal discussion with the full group rather than active controversy.

### 3.3 Alternative Proposals for Areas Without Agreement

- Alternative 1) Include: The energy facility shall be sited, designed and constructed so as to avoid, minimize, or mitigate adverse effects on rare plants and exemplary natural communities in consultation with the NH Natural Heritage Bureau.
- Alternative 2) The energy facility shall be sited, designed and constructed so as to avoid disturbance to:
  - a) Any occurrence of plant species ranked S1 (Critically Imperiled, State Endangered), SH (Historic, State Endangered), SX (Extirpated) or S2 (Imperiled, State Threatened) by the New Hampshire Natural Heritage Bureau.
  - b) Any occurrence of plant species ranked S3 (Vulnerable), unless NHNHB determines that the disturbance will not diminish the ability of the species to persist in the ecoregional subsection in which the occurrence is located.
  - c) Any occurrence of a natural community ranked S1 (Critically Imperiled) or S2 (Imperiled) by the New Hampshire Natural Heritage Bureau.
  - d) Any occurrence of a natural community ranked S3 (Vulnerable) and which is determined by NHNHB to have an Element Occurrence (quality) rank of A (Exemplary) or B (Good).
  - e) Any occurrence of a natural community ranked S4 (Apparently Secure) or S5 (Secure) and which is determined by NHNHB to have an Element Occurrence (quality) rank of A (Exemplary).
- Alternative 1) Include: The following shall apply unless waived in writing by state and federal wildlife agencies:
  - a) The energy facility shall be sited, designed and constructed so as to avoid, minimize, or mitigate the elimination, degradation, or disturbance of any significant habitat resource for a significant wildlife species.
  - b) A wind energy turbine shall not be sited:
    - within one-half mile of a documented peregrine falcon or golden eagle aerie, Bald Eagle nest;
    - within 1.5 miles of a known bat maternity/nursery colony or hibernaculum;
    - within 0.25 mile of a known Common Nighthawk nest site.
- Alternative 2) Omit the above.

## 4.0 Key Findings on Cumulative Impacts

### 4.1 Areas of Agreement

- Adequately addressing cumulative impacts requires more work and research than this working group can accomplish during this pre-rule making process.
- Cumulative impact assessments should consider positive effects, such as climate improvements, as well as negative impacts.

### 4.2 Areas Without Agreement

How to effectively address cumulative impacts with respect to natural resources.

### 4.3 Alternative Proposals for Areas Without Agreement

None at this time.

### 4.4 Other General Comments

Legislation passed this week (4 June) mandates that the Site Evaluation Committee address “cumulative impacts to natural, scenic, cultural, and recreational resources from multiple towers or projects or both” in rule-making relative to siting of wind energy systems. The working group has not had time to discuss how to address cumulative impacts in light of this legislation, which has not yet been signed. While the new law specifically addresses wind energy facilities, the SEC may decide whether or not to apply cumulative impacts analysis to other types of energy projects. A meeting of wildlife professionals, including representatives of academia, state and federal agencies, environmental consulting firms, and non-governmental organizations, to discuss effective approaches for addressing cumulative impacts on significant wildlife species would be very helpful. Crafting application requirements and siting criteria with respect to cumulative impacts on natural resources will require extensive input from natural resource professionals and consultation with individuals experienced in the other three resource areas specified.

The potential scope of cumulative impact assessments ranges from the potentially burdensome National Environmental Policy Act (NEPA) approach, which is accompanied by lengthy guidance documents from the CEQ, to assessments of cumulative impacts at the species level.

## 5.0 Key Findings on Mitigation and Adaptive Management

### 5.1 Areas of Agreement

- Current wetland-related mitigation concepts are addressed in state and federal wetland permitting processes, and need not be addressed by this working group.
- Pre-application wildlife studies should be designed to identify mitigation needs and with post-construction studies and opportunities for adaptive management in mind.

### 5.2 Areas Without Agreement

The group did not reach agreement regarding inclusion of the following items in rules. One area of disagreement in many cases revolved around *where* rather than *whether* these concepts should be addressed— i.e., whether these items should be addressed in SEC rules or in policies and recommendations of pertinent agencies. In other cases, the group had minimal time to discuss the concept.

### 5.3 Alternative Proposals for Areas Without Agreement

- Alternative 1) Include: The SEC shall require, where necessary, as conditions of the certificate appropriate post-construction studies to 1) ensure compliance with required standards or 2) to evaluate and mitigate adverse impacts of a facility that cannot be reliably predicted prior to permitting (“adaptive management”). Such studies, if any, shall be conducted for a minimum of two years within the first five years of facility operation.
- Alternative 2) Omit the above.
- Alternative 1) Include: The SEC shall require, where necessary, as a condition of the certificate an appropriate protocol for ongoing monitoring, documentation and reporting of wildlife mortality or injury by facility staff. Any observed mortality or injury event involving an individual of a significant wildlife species shall be reported to NH Fish and Game Department and the US Fish and Wildlife Service within 24 hours of discovery. Other wildlife mortalities shall be reported monthly to the New Hampshire Fish and Game by date, species, location, and circumstances. NH Fish and Game may recommend to the SEC that further study and/or adaptive management provisions be required based on observed mortality.
- Alternative 2) Omit the above.

- Alternative 1) Include: Adaptive management recognizes that knowledge about natural resource systems is sometimes uncertain; it is the preferred method of management in these cases. Where sufficient knowledge exists, actual implementation of a solution should not be replaced by adaptive management. Adaptive management studies shall be designed in consultation with and approval of an adaptive management team established by the certificate, including representatives of appropriate state and federal agencies and at least one professional with pertinent expertise. Results and recommendations to mitigate impacts identified from such studies shall be provided to the SEC and members of the adaptive management team within three months of the end of each field season or year of operation as appropriate. Subsequent to completion of such studies, or sooner if serious impacts are identified, the adaptive management team shall meet with representatives of the facility owner/operator and at least one member of the SEC to review results and identify satisfactory mitigation strategies. Mitigation strategies so developed shall become amendments to the facility permit.
- Alternative 2) Omit the above.
- Alternative 1) Include: An application for an energy development must contain, and the SEC shall require, best practical mitigation for all aspects of construction and operation of generating and transmission facilities. In determining best practical mitigation options, the SEC shall consider:
  - The existing state of technology;
  - The effectiveness of available technologies or methods for reducing impacts; and
  - The economic feasibility of the type of mitigation under consideration.
- Alternative 2) Omit the above.
- Alternative 1) Include: In determining whether an energy or transmission facility creates an unreasonable adverse effect on the natural environment, the SEC shall at a minimum consider the following resource areas: rare plants, rare and exemplary natural communities, steep and fragile soils, water and wetlands, and wildlife and wildlife habitat.
- Alternative 2) Omit the above.

#### 5.4 Other General Comments

None at this time.

## 6.0 Key Findings on Study Protocols

### 6.1 Areas of Agreement

- Specific protocols will vary among projects, and so should not be included in detail in the rules.
- Wildlife surveys should be scientific in nature and follow standard protocols where available, with details for each project determined through consultation with NH F&G, USFWS, and NHHB.

### 6.2 Areas Without Agreement

One area of disagreement and uncertainty revolved around the respective roles of the SEC and pertinent state agencies with respect to determining what studies should be conducted and what protocols should be used.

### 6.3 Alternative Proposals for Areas Without Agreement

Alternative 1) Include: All applicants for a certificate shall conduct pre-application surveys for evidence of significant wildlife species following pertinent, available protocols recommended by state and federal wildlife agencies.

Alternative 2) Omit the above.

[NOTE: The alternatives outlined below were not discussed specifically by the group, but were framed by C. Foss from key points in group discussions.]

Alternative 1) Studies and protocols are determined on a project-specific basis through agency consultation prior to SEC involvement, the SEC accepts agency recommendations, and the studies, protocols, and results become public when the application is submitted. (Status quo)

Alternative 2) Pertinent agencies provide a publically-available list of recommended basic and potential additional studies with accepted protocols.

Alternative 3) Application includes letters from pertinent agencies confirming that recommended studies have been properly conducted or outlining any shortcomings.

Alternative 4) Studies and protocols are determined through a pre-application process that includes public comment and SEC approval.

#### 6.4 Other General Comments

None at this time.

DRAFT

## Appendix A: Group Members

Name (First, Last)	Role (Member/Leader)	Affiliation (Town Resident, Company, Organization, Industry, etc.)
Bisbee, Dana	Member	Devine Millimet
Carbonneau, Lee	Leader	Normandeau Associates
Foss, Carol	Leader	NH Audubon
Gravel, Adam	Member	Stantec
Hunt, Pamela	Member	NH Audubon
Kanter, John	Member	NH Fish and Game Dept.
Lee, Mary	Member	Citizen
Linowes, Lisa	Member	The WindAction Group
Novello, Mike	Member	Wagner Forest Management
Publicover, Dave	Member	Appalachian Mountain Club
Rieman, Derek	Member	EDP Renewables
Smith, Stuart	Member	Grafton Energy
Tinus, Jacob	Member	Burns & McDonnell



## Appendix B: Group Meeting/Conference Call Dates and Notes

28 April 2014, 1300-1500: Meeting at McLane Center, Silk Farm Road, Concord, NH, with call-in option. Participants: D. Bisbee, L. Carbonneau, C. Foss, A. Gravel, P. Hunt, J. Kanter, M. Lee, L. Linowes, M. Novello, D. Publicover, S. Smith, J. Tinus

13 May 2004, 1530-1630: Conference call. Participants: D. Bisbee, L. Carbonneau, C. Foss, J. Tinus, and others.

15 May 2014, 1000-1200: Meeting at McLane Center, Silk Farm Road, Concord, NH, with call-in option. Participants: D. Bisbee, L. Carbonneau, A. Gravel, P. Hunt, M. Lee, L. Linowes, M. Novello, J. Tinus.

27 May 2014, 1200-1500: Meeting at McLane Center, Silk Farm Road, Concord, NH, with call-in option. Participants: D. Bisbee, L. Carbonneau, C. Foss, M. Novello, J. Tinus.

June 5, 2014, 1500-1800: Meeting at McLane Center, Silk Farm Road, Concord, NH, with call-in option. Participants: L. Carbonneau, C. Foss, A. Gravel, M. Lee, J. Tinus.

## **Wildlife, Rare Plants, and Natural Communities Working Group**

### **April 28, 2014 Meeting Summary**

#### **Attendees:**

#### **In Person**

Dana Bisbee  
Lee Carbonneau  
Carol Foss  
Pam Hunt  
John Kanter  
Lisa Linowes  
Jake Tinus

#### **by Phone**

Adam Gravel  
Mary Lee  
Mike Novello  
Dave Publicover  
Stuart Smith

**28 April 2014**

The group discussed relevant portions of the document submitted to Commissioner Burack on March 25, 2014 by the Appalachian Mountain Club, Audubon Society of New Hampshire, Conservation Law Foundation, Society for the Protection of New Hampshire Forests, and The Nature Conservancy. The group's discussion is reflected in marginal comments on the document below.

## DEFINITIONS

- “Rare plant” means any species included on the most recent version of the “Rare Plant List for New Hampshire” maintained by the New Hampshire Natural Heritage Bureau.
- “Natural community” means a recurring assemblage of plants and animals found in particular physical environments as classified in the New Hampshire Natural Heritage Bureau publication *Natural Communities of New Hampshire*. Rare natural communities are those ranked S1 (critically imperiled), S2 (imperiled) or S3 (very rare and local). Exemplary natural communities are those that have had relatively little alteration from human activity and retain a relatively natural composition and structure, including high-quality examples of common natural communities (i.e., those ranked S4 or S5).
- “Wildlife” means, as defined under NH RSA 207.1, XXXV, “all species of mammals, birds, fish, mollusks, crustaceans, amphibians, invertebrates, reptiles or their progeny or eggs which, whether raised in captivity or not, are normally found in a wild state.”
- “Significant wildlife species” means 1) any species listed as Threatened or Endangered, or which is a candidate for such listing, by the U.S. Fish and Wildlife Service; or 2) any species listed as Threatened, Endangered or Special Concern by the New Hampshire Department of Fish and Game.
- “Cumulative impact” means the incremental adverse effect of an energy facility on the resource values set forth in NH RSA 162-H:16, IV(c) when added to other existing and proposed development [defined in draft aesthetics criteria]. Cumulative impacts can result from individually minor but collectively significant developments taking place over a period of time. The committee may analyze cumulative impacts with reference to legal standards established under the National Environmental Policy Act, as amended, to the extent consistent with this definition<sup>1</sup>. [Comments: Need to revisit this topic as we get to implementation. Shouldn't cumulative impacts include neutral or positive as well as adverse effects?]
- “Best practical mitigation” means methods or technologies used during construction or operation of an energy development that control or reduce to the lowest feasible level impacts to aesthetics, historic sites, air and water quality, the natural environment, and public health and safety. [Comments: Term meant to reflect the conditions of a permit; not originally intended to include avoidance. Should this include BMPs? Need to work on this one!]

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<sup>1</sup> The committee may also consult federal guidance documents regarding the analysis of cumulative impacts, including but not limited to those prepared by the Council on Environmental Quality (see [http://energy.gov/sites/prod/files/nepapub/nepa\\_documents/RedDont/G-CEQ-ConsidCumulEffects.pdf](http://energy.gov/sites/prod/files/nepapub/nepa_documents/RedDont/G-CEQ-ConsidCumulEffects.pdf)) and the Environmental Protection Agency (see <http://www.epa.gov/compliance/resources/policies/nepa/cumulative.pdf>).

- “Adaptive management” means a system of management practices based on clearly identified desired outcomes, monitoring to determine if management actions are meeting outcomes, and, if not, provisions for management changes that will best ensure that outcomes are met or that outcomes are re-evaluated. [Need to review implementation of this]
- “Significant habitat resource” means habitat used by a species for critical life cycle functions, such as raptor nest sites, mammal denning sites, localized food resources, and bat maternity colonies and hibernacula.

#### **APPLICATION REQUIREMENTS** [Comment: Does the SEC need these to be in rules?]

1. Studies to determine the impact of the facility on the natural environment shall be designed in consultation with the appropriate state and federal agencies, including but not limited to the N.H. Department of Environmental Services, the N.H. Department of Fish and Game, the N.H. Department of Resources and Economic Development, the N.H. Natural Heritage Bureau, and the U.S Fish and Wildlife Service.
2. Applicants are encouraged to consult with other parties with relevant knowledge and expertise, including but not limited to municipal officials, non-governmental organizations, academic institutions and resource professionals, for input both on issues that need to be addressed by impact studies and on the appropriate methodology for conducting such studies. [Comment: Will this requirement pass JLCAR?]

#### **WILDLIFE STUDIES FOR ALL ENERGY PROJECTS**

The following shall apply unless waived in writing by state and federal wildlife agencies:

All applicants for a certificate shall conduct pre-application surveys for evidence of significant wildlife species following protocols provided by state and federal wildlife agencies. [Comments: Development of state protocols is underway and draft will be available as the SEC rule making process proceeds. Generally, these rules should not be in conflict with rule changes in other state agencies. The protocols are not rules, and this presents issues if specified here in a rule. How is this done in other states? How are their protocols developed and approved? Replace “provided by” with agreed to with” ?? Still leaves regulatory uncertainties for applicants. The SEC is not the final decision maker.]

- Applicants with a project in proximity to a significant habitat resource for a significant wildlife species may be requested to conduct additional studies in

negotiation with state and federal wildlife agencies. [Comments: How close is “in proximity? Can this be addressed in protocols? The first bullet could be the regularly prescribed studies, and this bullet might be any additional studies that are more site specific.]

- All applicants for a certificate shall prepare a cumulative impacts assessment addressing the scope and scale of potential effects of the facility, in combination with other existing or proposed development, on populations of significant wildlife species. [Comments: What is the geographic range to be considered? Some concern that “proposed development” is problematic – but refers to energy development for which some kind of application has been filed. Need thresholds – populations are not generally assessed by applicants, that is more in the realm of the natural resource agencies.]

### **General Standards**

1. The SEC shall consider the impacts to the resources set forth in NH RSA 162-H:16, IV(c) both individually and in combination. Impacts to multiple resources, none of which in itself is sufficient to create a finding of unreasonable adverse effect, may be sufficient to create such a finding when considered in combination. [Comment: How is this implemented? What does it mean?]
2. In addition to considering the impacts of the proposed facility in isolation, the SEC shall also consider the cumulative impacts of the proposed facility.

### **Resolving Adverse Impacts:** [Comment: Applies to all resources, not just ecological]

- a) The facility should be proposed and designed to avoid adverse effects on the resources identified in NH RSA 162-H:16, IV(c) to the extent practicable.
- b) In cases where adverse impacts cannot be avoided, measures to minimize adverse effects identified in the SEC’s review of the facility may support a finding that such adverse effects are not unreasonable.
- c) Where adverse impacts have been minimized to the extent practicable, in certain circumstances on-site mitigation measures or (where on-site mitigation measures are impractical or insufficient) off-site mitigation measures may support a finding that such adverse effects are not unreasonable. Mitigation measures must address the resource category adversely affected, reflect the best practical mitigation under the circumstances, and ensure resource benefits that exceed the adverse effects on the impacted resource. [Comments: Should this include only in-kind mitigation? Is “best practical mitigation” the right term? This section needs work. There are different criteria for different resources. Need something that works for all resources – aesthetic, historic, environmental, etc.]

### 3. Monitoring and Adaptive Management:

- a) The SEC shall require, where necessary, as conditions of the certificate appropriate post-construction studies to 1) ensure compliance with required standards or 2) to evaluate and mitigate adverse impacts of a facility that cannot be reliably predicted prior to permitting (“adaptive management”). Such studies, if any, shall be conducted for a minimum of two years within the first five years of facility operation.
- b) Adaptive management recognizes that knowledge about natural resource systems is sometimes uncertain; it is the preferred method of management in these cases. Where sufficient knowledge exists, actual implementation of a solution should not be replaced by adaptive management. Adaptive management studies shall be designed in consultation with and approval of an adaptive management team established by the certificate, including representatives of appropriate state and federal agencies and at least one professional with pertinent expertise. Results and recommendations to mitigate impacts identified from such studies shall be provided to the SEC and members of the adaptive management team within three months of the end of each field season or year of operation as appropriate. Subsequent to completion of such studies, or sooner if serious impacts are identified, the adaptive management team shall meet with representatives of the facility owner/operator and at least one member of the SEC to review results and identify satisfactory mitigation strategies. Mitigation strategies so developed shall become amendments to the facility permit. [Comments: Is an adaptive management team a new regulatory entity? Concept is based on Lempster (post-construction) advisory committee put together by Iberdrola. Could it formed in during the pre-construction process prior to the hearing? Needs to be in place to address study plans if possible, not specified after the certificate is issued. What power would it have?]
- c) The SEC shall require, where necessary, as a condition of the certificate an appropriate protocol for ongoing monitoring, documentation and reporting of wildlife mortality or injury by facility staff. Any observed mortality or injury event involving an individual of a significant wildlife species shall be reported to NH Fish and Game Department and the US Fish and Wildlife Service within 24 hours of discovery. Other wildlife mortalities shall be reported monthly to the New Hampshire Fish and Game by date, species, location, and circumstances. NH Fish and Game may recommend to the SEC that further study and/or adaptive management provisions be required based on observed mortality.

4. **Decommissioning.** The SEC shall require, where necessary, as a condition of certificate a decommissioning plan be submitted to and be approved. The plan must include, at a minimum, full funding for the removal of all components of the development, vegetative restoration of the developed area if it was built on previously undeveloped land, and maintenance of public safety and environmental protection during decommissioning. The SEC shall require the use of letters of credit, performance bonds, segregated funds, corporate parent guarantees and other forms of financial assurance to ensure that sufficient funds for decommissioning are available regardless of what point in the history of the development decommissioning becomes necessary and are sufficiently escrowed in case of bankruptcy. The anticipated salvage value of facility components or materials shall not be included in the determination of the decommissioning fund.
5. **Best Practical Mitigation.** An application for an energy development must contain, and the SEC shall require, best practical mitigation for all aspects of construction and operation of generating and transmission facilities. In determining best practical mitigation options, the SEC shall consider:
  - a) The existing state of technology;
  - b) The effectiveness of available technologies or methods for reducing impacts; and
  - c) The economic feasibility of the type of mitigation under consideration.
6. In determining whether an energy or transmission facility creates an unreasonable adverse effect on the natural environment, the SEC shall at a minimum consider the following resource areas: rare plants, rare and exemplary natural communities, steep and fragile soils, water and wetlands, and wildlife and wildlife habitat.

## **SITING CRITERIA**

### **RARE PLANTS AND NATURAL COMMUNITIES**

The energy facility shall be sited, designed and constructed so as to avoid disturbance to:

[Comment: "avoid disturbance to" needs revision]

- f) Any occurrence of plant species ranked S1 (Critically Imperiled, State Endangered), SH (Historic, State Endangered), SX (Extirpated) or S2 (Imperiled, State Threatened) by the New Hampshire Natural Heritage Bureau.
- g) Any occurrence of plant species ranked S3 (Vulnerable), unless NHNHB determines that the disturbance will not diminish the ability of the species to persist in the ecoregional subsection in which the occurrence is located.

- h) Any occurrence of a natural community ranked S1 (Critically Imperiled) or S2 (Imperiled) by the New Hampshire Natural Heritage Bureau.
- i) Any occurrence of a natural community ranked S3 (Vulnerable) and which is determined by NHNHB to have an Element Occurrence (quality) rank of A (Exemplary) or B (Good).
- j) Any occurrence of a natural community ranked S4 (Apparently Secure) or S5 (Secure) and which is determined by NHNHB to have an Element Occurrence (quality) rank of A (Exemplary).

## **WILDLIFE AND WILDLIFE HABITAT**

- c) The energy facility shall be sited, designed and constructed so as to avoid elimination, degradation, or disturbance of primary habitat for a significant wildlife species documented by the New Hampshire Fish & Game Department.
- d) A certificate shall not be issued if, in the determination of the New Hampshire Fish and Game Department, the facility's impact, alone or cumulatively with other existing and proposed projects,
  - would have an unreasonable adverse impact on a New Hampshire population of one or more significant wildlife species.
  - would significantly conflict with the goals and policies of the New Hampshire Wildlife Action Plan. **[Comment: This language needs some work]**
  -
- e) A wind energy turbine shall not be sited:
  - within one-half mile of a peregrine falcon or golden eagle aerie or an active nest of any endangered, threatened or special concern raptor species.
  - within 1.5 miles of a known bat maternity/nursery colony or hibernaculum.



## **Wildlife, Rare Plants, and Natural Communities Working Group**

### **May 15, 2014 Meeting Summary**

<b>Attendees:</b>	<b><u>In Person</u></b>	<b><u>by Phone</u></b>
	<b>Pam Hunt</b>	<b>Mike Novello</b>
	<b>Lee Carbonneau</b>	<b>Adam Gravel</b>
	<b>Jake Tinus</b>	<b>Lisa Linowes</b>
	<b>Dana Bisbee</b>	
	<b>Mary Lee</b>	

### **Issues Discussed**

#### **1) Whether/how to address cumulative impacts.**

##### **General Discussion**

The group discussed SB 281, which would direct the site evaluation committee to address, among other things, cumulative impacts to natural, scenic, recreational, and cultural resources. The member stated that even there is no current statutory authority for cumulative impact assessment, the SEC is free to consider cumulative impacts, and currently does so at their discretion. The potential scope of cumulative impact assessments was discussed, from the potentially burdensome National Environmental Policy Act (NEPA) approach, which is accompanied by lengthy guidance documents from the CEQ, to assessments of cumulative impacts at the species level. The absence of all but very minimal cumulative impact assessment requirements from current state statutes and regulations was discussed, as well as its current inclusion in NEPA and federal permitting.

##### **Apparent Agreement**

It was generally agreed that the subject of cumulative impacts is worthy of ongoing discussion as the SEC rule-making process continues, though the question remains of how the existing SEC process is insufficient. But it was also acknowledged that addressing it adequately requires more work and research than this working group can accomplish during this pre-rule making stage. There was apparent agreement that cumulative impact assessments, if included in SEC rules, should also consider positive effects, such as climate improvements, not just negative impacts.

### Debated or Related Points

- Having the SEC address cumulative impacts would duplicate efforts by the federal agencies in the NEPA and federal permitting process, which applies to most/all projects that come before the SEC.
- The Federal process has no bearing on the SEC process, so cumulative impacts should be addressed by the SEC.
- Assessment of cumulative impacts in NH state permitting should be consistent among the permitting programs – and since it has never been embraced in the past, should not be addressed by the SEC only.
- Energy projects are unique because they are sited in locations without other development (i.e. windfarms on mountaintops) and therefore different rules should apply.

### **2) Whether/how to define and address mitigation and the related adaptive management concepts.**

#### General Discussion

The group discussed mitigation, including wetland mitigation sequencing as defined by the US Environmental Protection Agency to include avoidance, minimization, and compensation; as well as mitigation of project effects on wildlife during construction and operation, which is part of the concept of adaptive management. Adaptive management addresses resource impacts that are anticipated, but cannot be fully evaluated during design, and may be evaluated during project operation through a comparison of pre-application and post-construction surveys. The SEC can require modifications to the operation of a project to reduce these impacts. Adaptive management is most commonly associated with wind projects, and is generally addressed in some manner by SEC applicants. It was also mentioned that wind projects include transmission lines to connect to the grid, and the impacts of those lines should not be overlooked.

#### Apparent Agreement

Current wetland-related mitigation concepts are addressed in state and federal wetland permitting processes, and should not be the focus of this working group. Pre-application studies for wildlife mitigation should be designed with post-construction studies and adaptive management in mind.

### Debated or Related Points

- Any required studies should address only data gaps and unknowns, not well-established results determined through previous projects.
- The rules should specify what pre and post studies are needed and how they should be done, perhaps modeled on those in VT (provided to all on our working group mailing list).
- Wind projects are not addressing the full range of potential wildlife impacts – for example, birds and bats are regularly addressed, but not large mammals.
- Studies at wind projects are already developed in consultation with, and approval by, state and federal agencies, who are the experts in identifying issues of importance.
- The rules can still require project siting that mitigates wildlife impacts.
- Widening a ROW by clearing results in stressed and ultimately dead trees adjacent to the ROW; this becomes a fire hazard, particularly in remote areas.

### **3) To what extent should “standard practices and/or standard protocols for wildlife and plant studies be codified in rules?”**

#### General Discussion

Although this topic was discussed in previous group meetings, it was raised to confirm whether there was, in fact, general agreement. It appears that slight disagreements remain, and further discussion may be warranted. Agreement appears to hinge on the related topic of whether the pre-application agency consultation process is sufficiently transparent, and therefore a suitable alternative to specifying protocols in the rules.

#### Apparent agreement

Specific protocols will vary for projects, and so should not be included in detail in the rules. Wildlife surveys should be scientific in nature and follow standard protocols where available, with details for each project determined through consultation with NH F&G, USFWS, and NHHNB.

### Debated or Related Points

- If the required studies are decided outside of (before) SEC involvement, the SEC should support the decision of what studies should be done, with recognition in the rules that weight be given to the agencies decisions.
- This happens already, since applications include the work plans and studies that were agreed to during pre-application consultations. The agencies should be trusted to provide appropriate guidance, although the SEC has on occasion ignored F&G recommendations and added completely different and more onerous conditions to a permit.
- Currently, pre-application consultations are not public and there is no SEC process for documenting that all requested studies were completed.
- No projects have public pre-application processes, but once the application is in, the process is fully public.
- Agencies with permitting authority must send letters and comments as to whether the permit application is complete early in the application review phase. The detailed review then occurs.
- For historical resources and F&G, there are no associated state permits. A letter, called a progress report, is submitted, often late in the proceedings, stating their opinion of the studies and post construction recommendations.
- Agencies should submit a letter early in the process that the applicant has done the studies that they wanted to see.
- This may force agency accountability, but an agency letter can hold up the whole process due to understaffing.
- It was stated that there may be a new/revised list from F&G of what studies should be done for wind projects. A checklist of wildlife, RTE plant, and natural community studies could be submitted by our working group for SEC and public consideration, but not necessarily as part of the rules.
- The rules could include the recognition that there are basic studies that should be done, in consultation with the agencies, without specifying those studies in the rules.

The next meeting is the May 16<sup>th</sup> presentation of the working groups from 9 AM to 12:30, at the legislative office building in Concord. Our working group results will be presented at 11 AM.

## **Wildlife, Rare Plants, and Natural Communities Working Group**

### **May 27, 2014 Meeting Summary**

<b>Attendees:</b>	<b>In Person</b>	<b>by Phone</b>
	<b>Dana Bisbee</b>	<b>Mike Novello</b>
	<b>Lee Carbonneau</b>	<b>Jake Tinus</b>
	<b>Carol Foss</b>	

Definitions - OK except for adaptive management, best mitigation practices, cumulative impacts

#### Application Requirements

- The applicant shall include documentation of meetings and conference calls with natural resource agency personnel and other natural resource professionals.
- The applicant shall include a copy of an information request to the N.H. Natural Heritage Bureau regarding known or potential occurrences of rare, threatened, and endangered plants and exemplary natural communities in the project area; a list of rare, threatened, and endangered plants and exemplary natural communities potentially affected by the project; an assessment of potential effects on such plants and natural communities; and proposed mitigation measures for any adverse effects.
- The applicant shall include copies of information requests to the N.H. Natural Heritage Bureau, NHFG, and USFWS regarding known or potential occurrences of significant wildlife species in the project area; a list of significant wildlife species potentially affected by the project; an assessment of potential effects on such wildlife species; and proposed mitigation measures for any adverse effects.
- The applicant shall include a report, prepared by a qualified professional, identifying and describing any critical wildlife habitat (as designated by the U.S. Fish and Wildlife Service) and any significant habitat resources; a list of critical wildlife habitat and significant habitat resources potentially affected by the project; an assessment of potential effects on such habitats and habitat resources; and proposed mitigation measures for any adverse effects.

Siting Criteria – group has not yet addressed

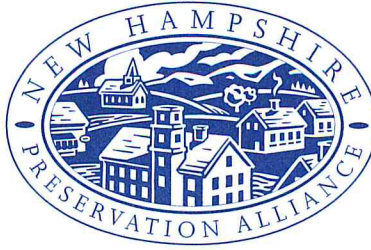
Cumulative Impacts - in notes from 15 May meeting

Mitigation – in notes from 15 May meeting

Standard Practices - in notes from 15 May meeting

Study Protocols – in notes from initial meeting, need to include information on what protocols currently exist

DRAFT



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EXECUTIVE DIRECTOR  
JENNIFER GOODMAN

To: Meredith Hatfield, Director, Office of Energy and Planning

From: Jennifer Goodman, Director, N.H. Preservation Alliance

Date: June 5, 2014

Re: Pre-rulemaking phase

Sent by email

The N.H. Preservation Alliance appreciates the important progress toward the goal of improving the site evaluation committee process that has been made by your agency and other stakeholders.

In this document, please find our recommendations that are designed to help clarify and improve the Site Evaluation Committee process for applicants and reviewers as it relates to proposed projects' impacts on historic sites. The suggestions relate to definitions, the application process and selection criteria. They are based in existing law and policy. It is an updated version of the May 16, 2014 document posted by your office in the general criteria section at <http://www.nh.gov/oep/energy/programs/sb99pre-rulemaking.htm>. Staff at the N.H. Division of Historical Resources and other stakeholders contributed to the development of this document.

Please let me know if you have questions, and we look forward to continued engagement in this important activity.

cc: Brandy Chambers, Energy Analyst, Office of Energy and Planning

Definitions	Recommendation	Source	Notes/Points of Discussion
<p><b>Adverse Effect</b></p>	<p>§ 800.5 Assessment of adverse effects.</p> <p>(a)</p> <p>(1) <i>Criteria of adverse effect.</i> An adverse effect is found when an undertaking may alter, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the National Register in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association. Consideration shall be given to all qualifying characteristics of a historic property, including those that may have been identified subsequent to the original evaluation of the property's eligibility for the National Register. Adverse effects may include reasonably foreseeable effects caused by the undertaking that may occur later in time, be farther removed in distance or be cumulative.</p>	<p>National Historic Preservation Act (NHPA) Section 106</p>	<p>Note that “undertaking” and “project” can be used interchangeably.</p>
<p><b>Alternatives Analysis</b></p>	<p>Use National Environmental Protection Act (NEPA) process. See column to right.</p>	<p>NEPA</p>	<p>NEPA regulations lay out a process for evaluating alternatives: 40 CFR §1502.14 Alternatives including the proposed action.</p> <p><i>Based on the information and analysis presented in the sections on the Affected Environment (§1502.15) and the Environmental Consequences (§1502.16), it should present the environmental impacts of the proposal and the alternatives in comparative form, thus sharply defining</i></p>



<p><b>Area of Potential Effect (APE)</b></p>			<p><i>the issues and providing a clear basis for choice among options by the decision maker and the public.</i> [Italics added] In this section agencies shall:</p> <p>(a) Rigorously explore and objectively evaluate all reasonable alternatives, and for alternatives which were eliminated from detailed study, briefly discuss the reasons for their having been eliminated.</p> <p>(b) Devote substantial treatment to each alternative considered in detail including the proposed action so that reviewers may evaluate their comparative merits.</p> <p>(c) Include reasonable alternatives not within the jurisdiction of the lead agency.</p> <p>(d) Include the alternative of no action.</p> <p>(e) Identify the agency's preferred alternative or alternatives, if one or more exists, in the draft statement and identify such alternative in the final statement unless another law prohibits the expression of such a preference.</p> <p>(f) Include appropriate mitigation measures not already included in the proposed action or alternatives.</p>
	<p>36 CFR § 800.16(d) geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist. The area of potential effects is influenced by the scale and nature of an undertaking and may be different for different kinds of effects caused by the undertaking.</p>	<p>Section 106 (NHPA)</p>	

<b>Historic Site*</b>	36 CFR § 800.16(D)(1): Historic property [site] means any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the National Register of Historic Places maintained by the Secretary of the Interior. The term includes properties [sites] of traditional religious and cultural importance to an Indian tribe and that meet the National Register criteria.	Section 106 (NHPA)	<p>*Using “historic site” rather than “historic property” to be consistent with current Site Evaluation Committee (SEC) language. Recommend that if changes are made to state law in the future, that “historic property” be used as consistent with existing state and federal laws.</p> <p>For the purposes of this table, “historic property” has not been replaced with “historic site” where definitions are taken directly from other regulations.</p> <p>State register of historic places properties are not included in this recommendation as N.H. RSA 227-C:33 III states “Listing a property in the state register does not prohibit any actions that may otherwise be taken by the property owner with respect to the listed property.”</p>
<b>Cumulative Effect</b>	Suggestions in column on right.	Section 106 (NHPA); NEPA 40 CFR §1508.7.	<p>Section 106, at 36 CFR 800.5(1), addresses cumulative effects by noting “. . . Adverse effects may include reasonably foreseeable effects caused by the undertaking that may occur later in time, be farther removed in distance or be cumulative” but does not specifically define cumulative effect.</p> <p>40 CFR §1508.7: The NEPA definition of a cumulative effect/impacts comes from the Council on Environmental Quality (CEQ), which defines a cumulative impact as:          ...The impact on the environment which results from the incremental impact of the</p>

			<p>action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time. (40 CFR §1508.7.)</p> <p>Thoughts from other sources:  Cumulative effects to natural, cultural, historic resources and/or human communities are not just the result of the undertaking itself, but also <u>other collective actions and projects</u> that occur in a study area over time. For example, other actions may include other local or state transportation projects, sewer service extensions or expansion projects, residential, commercial and industrial development plans and large-scale development such as a large subdivision or warehouse/distribution center  (<a href="http://www.dot.wisconsin.gov/localgov/docs/landuse-cumulative.pdf">http://www.dot.wisconsin.gov/localgov/docs/landuse-cumulative.pdf</a>.)</p>
<b>Unreasonable Adverse Effect</b>	<p>Suggestions in column on right.</p>	<p>Appendix A to Part 800 --  Criteria for Council  Involvement in Reviewing  Individual section 106  Cases:</p>	<p>There is no category of “unreasonable adverse effect” among Section 106 findings. (Adverse effect, as defined by Section 106, is on Page 1 of this chart.)  Historic sites are irreplaceable – once gone they cannot be recreated. Possible considerations for a SEC finding of “unreasonable adverse effects” to historic sites could include projects that present substantial impacts on highly important historic properties (properties that are of</p>



			unusual or noteworthy importance or are a rare property type); that present substantial impacts on a large number of historic properties; or cases with substantial public concerns.
<p><b>Integrity of location, design, setting, materials, workmanship, feeling, association*</b></p> <p>*Provided for informational purposes, for use in cross-discussion with other definitions presented by other working groups. Not necessarily recommended for final inclusion in SEC rules.</p>		National Register Bulletin 15	<p><b>Location: Location is the place where the historic property was constructed or the place where the historic event occurred.</b> The relationship between the property and its location is often important to understanding why the property was created or why something happened. The actual location of a historic property, complemented by its setting, is particularly important in recapturing the sense of historic events and persons.</p> <p><b>Design: Design is the combination of elements that create the form, plan, space, structure, and style of a property.</b> A property's design reflects historic functions and technologies as well as aesthetics. It also applies to the way in which buildings, sites, or structures are related: for example, spatial relationships between major features; visual rhythms in a streetscape or landscape plantings; the layout and materials of walkways and roads; and the relationship of other features, such as statues, water fountains, and archeological sites.</p> <p><b>Setting: Setting is the physical environment of a historic property...</b>setting refers to the <i>character</i> of the place in which the property played its historical role. It involves <i>how</i>, not just where, the property is situated and its</p>

		<p>relationship to surrounding features and open space.</p> <p><b>Materials:</b> Materials are the physical elements that were combined or deposited during a particular period of time and in a particular pattern or configuration to form a historic property. A property must retain the key exterior materials dating from the period of its historic significance.</p> <p><b>Workmanship:</b> Workmanship is the physical evidence of the crafts of a particular culture or people during any given period in history or prehistory. Workmanship is important because it can furnish evidence of the technology of a craft, illustrate the aesthetic principles of a historic or prehistoric period, and reveal individual, local, regional, or national applications of both technological practices and aesthetic principles.</p> <p><b>Feeling:</b> Feeling is a property's expression of the aesthetic or historic sense of a particular period of time. It results from the presence of physical features that, taken together, convey the property's historic character.</p> <p><b>Association:</b> Association is the direct link between an important historic event or person and a historic property. A property retains association if it is the place where the event or activity occurred and is sufficiently intact to convey that relationship to an observer.</p>
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<b>Mitigation Agreement</b>	A document that records the terms and conditions agreed upon to address the adverse effects of an undertaking upon historic properties [sites]. This document could take the form of a Memorandum of Agreement, Memorandum of Understanding, Programmatic Agreement or other legal document.	Section 106 (NHPA)	
<b>Best Practical Mitigation</b>	Needs further discussion.		Mitigation strategies and best practices may differ depending on the affected resource and the nature of effect. Some resources can be recreated off-site and others cannot. Definition used by others is very technology focused. The definition (Natural Environment WG) includes historic sites.

Application materials	Recommendation	Source	Notes/Points of Discussion
<b>Reasonable/useful application materials</b>	Written documentation that confirms completion of project initiation, APE development, historic property identification, public involvement, and determination of effect per state procedures.	Section 106 (NHPA); RSA 227C:9 and state procedures	
<b>Complete application</b>	Finding by N.H. Division of Historical Resources and lead federal agency (if applicable) of no historic properties affected, no adverse effect, or adverse effect.	Section 106 (NHPA)	

Siting Criteria	Recommendation	Source	Notes/Points of Discussion
The SEC shall not issue a certificate if the proposed facility:	<ol style="list-style-type: none"> <li>1) Has not taken all reasonable and practical measures to avoid, minimize or mitigate adverse effects to historic resources</li> <li>2) Has an unreasonable adverse effect</li> <li>3) Is in conflict with Master Plan/ preservation chapter.</li> <li>4) Is in conflict with a local historic district ordinance.</li> <li>5) Is in conflict with a community's preservation plan.</li> </ol>	Other working group draft ideas	

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