

**STATE OF CONNECTICUT
CONNECTICUT SITING COUNCIL**

**Petition of BNE Energy Inc. for a
Declaratory Ruling for the Location,
Construction and Operation of a 4.8 MW
Wind Renewable Generating Project on
Winsted-Norfolk Road in Colebrook,
Connecticut (“Wind Colebrook North”)**

Petition No. 984

March 15, 2011

PRE-FILED TESTIMONY OF MICHAEL S. KLEIN

Q1. Please state your name, employer and your employer’s address.

A1. My name is Michael Klein, principal of Environmental Planning Services (EPS), 89 Belknap Road, West Hartford, CT.

Q2. What is your occupation?

A2. I am a biologist and soil scientist with 34 years of experience in biological and wetland surveys, erosion and sediment control, impact assessment and mitigation design. My clients include private developers, town and state agencies, and citizen groups. I have served on a municipal Inland Wetlands and Watercourses Commission and a Planning and Zoning Commission. A copy of my current CV is attached to this testimony.

Q3. Have you testified before the Siting Council before?

A3. Yes, I submitted pre-filed testimony regarding the BNE Energy, Inc. (“BNE”) petition to site a wind project in Prospect, Connecticut in February 2011 and concurrent herewith have submitted pre-filed testimony regarding the BNE petition to site a wind project on Flagg Hill Road in Colebrook, Connecticut (“Wind Colebrook South”). I have also testified before the Siting Council regarding a proposed gas-fired power plant in Southington, CT in 1998/1999. I have testified in Connecticut Superior Court several times over the years and do so frequently

before local land use boards. This subject matter of this testimony varies, but most frequently addresses wetland and biological inventories and the impact of various human alterations on those resources. This testimony is most frequently prepared on behalf of prospective site developers, but also includes numerous reviews on behalf of local land use agencies.

Q4. What is your involvement with this proceeding?

A4. EPS was retained by FairwindCT, Inc., Susan Wagner and Michael and Stella Somers to review the potential impacts of the proposed BNE Wind Colebrook North turbine project on wetlands and watercourses, water quality, and bio-diversity. I agreed to make an initial review with the proviso that if there were no significant issues I would decline to participate further.

Q5. What did your initial review of this petition reveal?

A5. I determined that there are numerous flaws in the baseline natural resources inventory. Therefore the impact assessment was flawed, and that because of those flaws; the conclusions reached by BNE are unsubstantiated.

Q6. What is your general conclusion, after more detailed review of this petition?

A6. Construction of the project as shown on the plans result in substantial adverse impacts and destruction of wetlands, watercourses, and natural resources of the state. The conclusions presented in Vol. 1 of the Petition are unsubstantiated, particularly with respect to indirect and cumulative impacts of site development, because BNE and its consultants failed to provide adequate data that would permit an accurate site assessment.

Q7. Please elaborate on that conclusion.

A7. I recognize that renewable energy projects are necessary to support sustainable growth. These projects may require trade-offs; in some cases impacts may be unavoidable. This

must be explicitly recognized in a review process that balances our energy needs against impacts on wetlands and watercourses, bio-diversity, runoff, and water quality. Accurate resource data, interpreted by the appropriate scientists, is necessary. Data collection standards can be tailored to facility type and size but desk-top methods are not a substitute for site-specific surveys. The level of detail required should be conservative due to the many unknowns that exist with respect to wind power.

Q8. What are your most significant findings?

A8. First, that the wetland and biological surveys submitted are inadequate to allow the Siting Council to make a reasoned judgment. The timing and duration of many of the surveys was not sufficient to identify the resources present, let alone describe and evaluate potential impacts. Given the availability of specific technical guidance for pre-construction biological surveys in neighboring NY and NJ, this failure is inexplicable and significant.

Second, that the site development plans will result in substantial indirect adverse impacts from erosion, sedimentation, and degradation of water quality.

Q9. Please describe how the surveys conducted by BNE's consultants were insufficient.

A9. For example, no in-season, systematic on-site surveys for vernal pools, mammals, reptiles, or amphibians were conducted, despite the petitioner's incidental observation of a state-listed species (Northern Leopard Frog, *Rana pipiens* Petition, Vol. 3, Exhibit L, Table 4, p. 13). Smooth Green Snake (*Liochlorophis vernalis*) and Great St. Johnswort (*Hypericum ascyron*), both state-listed species, are documented in the immediate site vicinity, yet no site surveys were completed for either of these species.

In fact, BNE has not filed any field surveys of the wildlife at this site, and the only site-specific vegetative data reported was collected incidental to the wetland evaluation and covers at best, approximately 25% of the site.

Q10. What were your findings regarding the bat and bird studies submitted by BNE?

A10. The bat and bird surveys are the only systematic field surveys that were submitted, but they are from another parcel (Wind Colebrook South). They also suffer from other, major methodological flaws which significantly impair their utility in supporting an impact assessment. These are described in more detail in the testimony of my colleagues, Eric Davison and Dr. Scott Reynolds, but include:

- failure to follow CT DEP's protocol for breeding bird surveys,
- a very high number of "un-identifieds" in the bird survey,
- use of bat detectors placed close to the ground, rather than at higher elevations on the meteorological tower at the site. These towers are routinely used to collect data on bat use in the "rotor-swept area."

Q11. What were your findings regarding BNE's assessment of vernal pools on the site?

A11. Despite the fact that Wood Frog (*Rana sylvatica*), a vernal pool obligate species, was identified in another "incidental observation," no in-season vernal pool or amphibian surveys were conducted. Surveys conducted in the winter or in mid-summer are of little use in identifying or evaluating vernal pools. This omission is compounded because the applicant's wetland scientist reported that Wetland 2 is "a small, forested wetland depression . . ." that "may be subject to shallow seasonal inundation." (Petition Vol. 3, Exhibit I, Attachment A.) That statement is a near-textbook description of a vernal pool. Nor was an assessment made of the

terrestrial habitat value of the site for vernal pool obligate species which may be breeding on-site or in nearby offsite wetlands. In short, BNE failed to conduct a vernal pool survey, despite indications that there may well be vernal pools on site.

Q12. What are your findings regarding the habitat survey for the Smooth Green Snake?

A12. The habitat survey for Smooth Green Snake that Vanasse Hangen Brustlin, Inc. (“VHB”) prepared (Petition Vol. 3, Exhibit I, Attachment C) is disingenuous and in direct conflict with other portions of their work reported in the body of the exhibit. In the body of Exhibit I (p. 6), six major habitat types are identified; second growth Northern Hardwoods, second growth Northern Hardwoods -Hemlock-White Pine Forest, early successional Northern Hardwood Forest, Palustrine forested wetlands, Palustrine scrub-shrub-emergent wetlands and maintained lawn. In Attachment C, the habitat survey sent to the CT DEP, VHB identified only four habitat types; second growth upland forest, forested wetlands, maintained lawn, and shrub swamp. By lumping all of the forested habitats together, VHB avoided reference to early successional Northern Hardwood Forest.

This is critical because Klemens (1993), the reference VHB cites, describes Smooth Green Snakes as “also found in transitional and lightly forested habitats such as grassy old fields with scattered shrubs and trees, as well as oak-pitch pine woodlands.”¹ (Emphasis added.) The Early Successional Northern Hardwoods Forest VHB identified in the body of Exhibit I is dominated by species characteristic of transitional, lightly forested habitats. Furthermore, the area between the golf driving range and this early successional forest can clearly be seen in aerial photographs as a meadow or grassy old field, which Klemens (1993) also identifies as Smooth

¹ Klemens, M. W., Ph.D., 1993, Amphibians and Reptiles of Connecticut and Adjacent Regions, State Geological and Natural History Survey of Connecticut, Bulletin 112).

Green Snake Habitat. VHB's characterization of the site as not providing appropriate habitat is incorrect and contradicted by its own findings.

Q13. Did BNE's consultant survey the site for other state-listed threatened species which might reasonably be expected at the site?

A13. No. VHB failed to conduct a survey for Northern Spring Salamander (*Gyrinophilus porphyriticus*), which is a state-listed Threatened Species known to be present in Colebrook (Klemens 1993). This salamander inhabits uplands above 500' in Litchfield and northwestern Hartford counties, "where spring salamanders are found both in surface runoff, i.e., springs and brooks, as well as in springs and seeps."² This omission is particularly puzzling, in light of the statement (Petition, Vol 3, Exhibit I, p. 5), that Klemens 1993 work was consulted to provide "distribution information and specific habitat comments pertinent to Connecticut's physiography that provide a more localized view of potential amphibian and reptile species."

Q14. What other problems did you find with regard to BNE's wildlife and wetland evaluations?

A14. There are other significant flaws in the wildlife and wetland evaluations which make the impact assessment unreliable, including the following:

- VHB states (11/17/2010 letter) that its habitat survey for Smooth Green Snake was completed prior to Julie Victoria's 9/3/2010 letter requesting such a survey, yet Exhibit I of the Petition states that the Fauna study is based on an October 2010 field survey.
- No statement of the field survey effort or qualifications of the field crew were provided. Given the low diversity of wildlife observed at the site and the reliance

² Klemens, M. W., Ph.D., 1993, Amphibians and Reptiles of Connecticut and Adjacent Regions, State Geological and Natural History Survey of Connecticut, Bulletin 112).

on professional judgment, this information is critical to an evaluation of the adequacy of the inventory and impact assessment.

- The wildlife species list provided in Exhibit J (Table 4) is reportedly based on three habitat types described by DeGraaf and Yamasaki³; Northern Hardwoods, Shrub Swamp, and Stream. However, based on a review of the report and aerial photographs of the site, the property likely also contains five additional habitat types: Swamp Hardwoods, Eastern Hemlock, Grass, Riparian Zone, and Shallow Marsh. The inclusion of these habitat types would have resulted in a significantly more diverse list of wildlife on Table 4.
- VHB did not conduct the functional evaluation of the wetlands correctly. Only one of the wetlands at the site was evaluated. The limit of the wetland evaluation unit was not defined consistently across all functions and values. For some functions, the wetland was only evaluated in the vicinity of the direct wetland impact proposed; in other cases the evaluation covered the entire wetland. Indirect impacts were not considered at all in making this modification to the method. In at least one case, one of the qualifiers was left undetermined.
- The wetland impact assessment is incomplete. VHB characterizes it as “preliminary” in Vol. 3, Exhibit J, p. 25, “due to the absence of topographic survey of the wetland crossing. VHB recognizes that the impact assessment cannot be considered final without a final design and that the design cannot be finalized without a final topographic survey.

³ DeGraaf, R.M. and M. Yamasaki 2001. *New England Wildlife: Habitat, Natural History, and Distribution*. University Press of New England. 482 pp.

The errors and omissions noted above have resulted in a very incomplete understanding of the resource values present at the site. Without an accurate site inventory, an accurate impact assessment is impossible. Therefore, the conclusions presented in Vol. 1 of the Petition are unsubstantiated, particularly with respect to indirect and cumulative impacts of site development.

Q15. Does BNE's petition comply with sound environmental design practices, the CT DEP Stormwater General Permit, the CT Erosion and Sediment Control Manual, and the CT Water Quality Standards?

A15. No, it does not. As I stated previously, the baseline data collection, upon which the design and the environmental assessment are based is flawed in many ways:

- The topographic information is of unknown accuracy.
- No site-specific data was provided for birds and bats, the two animal groups documented to be adversely affected by wind turbine operation.

Furthermore, the plans for development of the site do not meet best management practices, the CT Guidelines for Erosion and Sediment Control, the CT Stormwater General Permit for Construction and Operation, and the CT Water Quality Standards:

- The erosion and sediment controls were not designed in accordance with the CT DEP's Erosion and Sediment Control Manual. They are clearly inadequate to protect downstream wetlands and water quality.
- The Stormwater Pollution Prevention Plan does not meet the following portions of the CT General Permit for the Discharge of Stormwater and Dewatering Wastewaters Associated with Construction Activities.
 - Section 3, paragraphs (2), (3), and (5).
 - Section 6 paragraphs (b) (1) (A); (b) (6) (A) (iii); (b) (6) (A), (iv); (b) (6) (B); (b) (6) (C), (i) 1); (b) (6) (C), (i) 2); (b) (6) (C), (ii); (b) (6) (C), (iii) 1); (b) (6) (C), (iii) 2).

- Implementation of the plans as submitted will result in violation of the CT Water Quality Standards 2, 9, 15, 18, 19, 20, and 33.
- Implementation of the plans as submitted is reasonably likely to result in violation of the CT Surface Water Quality Criteria for color, suspended and settleable solids, silt or sand deposits, turbidity, phosphorus, and benthic invertebrates.

Q16. What is your opinion of BNE's proposed site plans, stormwater prevention plans and erosion control plans?

A16. The erosion and sediment controls and stormwater treatment measures are inadequate. The plans do not meet even the minimum standards for erosion control and stormwater management. At a site like this, that supports, or is reasonably likely to support, high quality wetland, wildlife and biological resources, the controls should exceed the minimum standards. Significant, uncontrolled erosion will occur and will result in pollution of watercourses and adverse impacts to fish and in-stream biota. The sediment will degrade the wetlands and destroy fish habitat and other natural resources. All of those occurrences will violate the water quality standards of this State.

Q17. Please describe the basis for your opinion that BNE's plans fail to comply with Connecticut's water quality standards.

A17. The plans are incomplete and the supporting documentation suffers from many technical deficiencies. The conclusions with respect to absence of direct or indirect wetland impacts are incorrect. The proposed development of the site does not conform to the CT Guidelines for Erosion and Sediment Control.

Approximately 45% of the site is moderately to steeply sloping. Erection of each of the turbines requires construction of large, smoothly graded pads for assembly of the blade and tower on the hillsides, as well as access roads that can accommodate the heavy equipment

necessary to assemble and erect the turbines. The cut and fill slopes shown are substantially steeper than what is permitted under the DEP's 2002 Guidelines for Soil Erosion and Sediment Control and cannot be stabilized as shown.

The gravel access road to Turbines 2 and 3 contains long, steep grades down to the wetland from the east and the west. Stormwater velocities will erode the road surface and the drainage ditches. No sediment traps or energy dissipation is provided at the outlets of the drainage ditches. Only one sediment structure is proposed for the entire site, which will treat a small portion of the drainage in the vicinity of Turbine 2. That one structure is not designed to the relevant standards. Its sides are themselves steeply sloping, improperly stabilized, and will erode. No outlet structure or energy dissipation is provided. Re-concentration of flow downslope of the basin will cause erosion, resulting in sedimentation and destruction of wetlands and watercourses. Sediment and nutrients that reach the wetlands will be transported downstream into Mill Brook and will degrade its fishery and the high-quality shrub swamp/emergent wetland near the property line.

There will be short and long term changes in runoff and recharge as a result of drainage measures necessary to control stormwater. In addition to erosion, this also has a high potential to alter the hydrologic regime of the wetlands, which are supported by groundwater seepage and surface runoff. The deep cuts proposed will likely intercept seasonal high groundwater. The cuts will be subject to seepage during the fall, winter, and spring. Coupled with the steepness, these cuts will be difficult to impossible to stabilize. The diversion trenches and roadside ditches will intercept ground water and runoff, altering the existing flows and seepage that supports the wetlands.

The CT Water Quality Standards require:

- non-degradation of existing high quality waters;

- protection of aquatic life;
- protection of benthic invertebrates;
- Best Management Practices for control of non-point source pollutants;
- Best Management Practices for control of phosphorus and nitrogen;
- Best Management Practices for control of nutrients and sediment;
- Application of these standards to all surface waters including wetlands and intermittent streams and specifically including the discharge of dredged or fill material to wetlands.

The plans do not represent best management practices for control of non-point source pollutants, such as sediment, phosphorus and nitrogen. The resultant discharges will degrade the existing high quality intermittent and perennial streams at the site, will adversely affect aquatic life, benthic organisms, and wetlands.

Q18. What other deficiencies have you found with regard to stormwater and erosion control?

A18. The grading and erosion control plans are incomplete or deficient in many ways.

- The plans are based on topographic information of unknown accuracy, which was not field verified and was not intended for use in engineering design. BNE's wetland consultant recognizes this in their report. Use of this unverified information is not in accordance with best management practices, the CT Erosion and Sediment Control Manual and the CT Stormwater General Permit.
- No measures for sediment control from dewatering discharges are shown, despite the stream crossing detail which requires excavating and pouring footings in the wetland. These measures are required under the CT Erosion and Sediment Control Manual and the CT Stormwater General Permit.

- The total volume of earthwork (cut and fill) is not shown, as required under the CT Erosion and Sediment Control Manual and the CT Stormwater General Permit.
- There is no indication if the earthwork is balanced. If not, the net import or export should be specified, so that erosion potential and traffic impacts can be evaluated.
- Specialized materials (bank-run gravel, process gravel, rip-rap, etc.) will be required, which will have to be imported to the site. Without an estimate of the required volumes, it is not possible to evaluate traffic impacts.
- There is no estimate of the volume of topsoil required for restoration or an analysis of the sufficiency of the on-site topsoil, in terms of volume and fertility.
- There is no grading shown for the downslope blade at each assembly area. If two arms of the blade are to be assembled and then the blade rotated, a substantial area of wetlands will be affected. If the blade is to be cantilevered, it seems likely that some form of support will be required. At turbine 1, that support would have to be located in the wetland. The area to be cleared around the arms of the blades varies with no explanation. The apparent intent is to minimize the amount of wetland disturbance required.
- The access road stormwater ditches and side slopes are designed with 1:1 side slopes, which is not permitted under the CT Erosion and Sediment Control Manual and the CT Stormwater General Permit. This exceeds the slope which can be stabilized as the plans depict (with vegetation). The side slopes and bottom of the ditches will experience substantial erosion which will discharge to and pollute the wetlands and watercourses. Using more shallow side slopes will

greatly expand the area of disturbance, opening additional soils to erosion and further altering site discharge characteristics.

- No energy dissipation or stable outlet is shown for the roadside ditches or the sediment structure at Turbine 2 in violation of the CT Erosion and Sediment Control Manual and the CT Stormwater General Permit.
- There are no standards for determining success of the proposed restoration, nor is there any allowance for necessary remedial measures that may be required. For example, invasive species control is very important on a site where large areas of soil will be exposed, yet there are no plans for monitoring for their presence or a contingency if invasion occurs, as required under good environmental practice.
- There are no financial assurances securing the restoration, nor is the restored area subject to any restrictive easement guaranteeing its preservation in perpetuity. This is one of the major flaws in BNE's argument that its plan provides some wildlife benefits by elimination of other development.
- There are no calculations demonstrating the adequacy of the soil stockpile areas.
- The plans for the wetland and stream crossing are incomplete as shown by the following:
 - The call-out on sheet C- 304 - "stabilize bank as required to minimize erosion"
 - the stream crossing details on sheet C-503 which specifies the width of the culvert only as 1.2 x bankfull width without indicating what that width is;
 - indicates that the height of the culvert varies without specifying it,
 - requires a culvert opening ratio of greater than .25:1 without specifying the length, width, or height of the culvert.
- Vol. 3 Exhibit J, p. 25, which labels the wetland impact analysis as preliminary due to the absence of topographic survey data.

- The plans do not address long term stormwater quality control and therefore do not comply with the CT Stormwater General Permit. Degraded stormwater will pollute and impair the wetlands and the downstream watercourses.
- The plans do not include measures to mitigate changes in the peak rate or volume of stormwater runoff due to conversion of forest to meadow and gravel road. The watercourse to which the road and other disturbed areas drain will become flashier, with more rapid and higher peak flows, resulting in erosion and degradation of downstream habitat.

There are also numerous conflicts on the plans. For example:

- The general erosion control notes limit earthen slopes to 2:1 or shallower, without special design and certification by a geo-technical engineer. The plans contain many instances of slopes much steeper than 2:1 without the required certified design
- Sheet C-201, Note 9 limits the grading to slopes no steeper than 2:1. The grading plans show many slopes that are 1:1 slope. This also conflicts with the Erosion and Sediment Guidelines.
- The erosion control barriers (silt fence and haybales) do not conform to the requirements of the Erosion Control Manual or the details shown on the plans.
- The grading shown for the apparent sediment structure does not conform to the details in the Erosion and Sediment Control Plan. Grading in accordance with the plan sheets will result in an embankment that is too steep to be stable as shown.
- The wetland and watercourse crossing detail on sheet C- 503 calls for a box culvert in two places, shows a cross section of an inverted U culvert with footings in third place, and specifies corrugated culverts in a fourth place.

Q19. Is the plan reasonably likely to result in unreasonable pollution, impairment or destruction of wetlands, water quality, wildlife, or the natural resources of the State.

A19. As shown, the construction will result in erosion and subsequent discharge of sediment to the wetlands and watercourses on and adjacent to the site. Clearcutting in the wetlands will be required to assemble one of the rotors. The result will be smothering of vegetation, loss and degradation of wetland habitat, and impairment of water quality. The plans also do not adequately address site restoration or post-construction stormwater management. No measures for long term water quality treatment are proposed. The site restoration plan is incomplete and does not adequately address conveyance of collected stormwater to a stable outlet. Based on my experience at other sites in Connecticut, these deficiencies will result in additional erosion and long term sedimentation and pollution of wetlands and watercourses. The plans are reasonably likely to result in unreasonable water pollution, impairment of wildlife habitat, and destruction of wetlands and other natural resources.

The statements above are true and accurate to the best of my knowledge.

3/15/2011
Date

Michael S. Klein
Michael S. Klein

ATTACHMENT

Exhibit 1 CV of Michael Klein

EXHIBIT 1

RESUME

MICHAEL STEPHEN KLEIN, CPWS

POSITION Principal

TENURE 1983-Present

DUTIES Prepares site evaluations and impact assessments for EPS projects. Responsibilities include coordinating work of all subcontractors, liaison with regulatory agencies and clients, conducting field surveys, flagging wetland limits, designing mitigation projects, supervising construction, reviewing plans and recommendations for impact minimization. Presents results at public hearings and agency meetings.

PREVIOUS EXPERIENCE Senior Environmental Analyst, MRE, 1978-1983.
Ecologist, COMSIS Corporation, 1977-1978.

EDUCATION BA, Biology, 1973, University of Connecticut.
MS, Marine Environmental Sciences, 1976
State University of New York at Stony Brook, Stony Brook, NY.

CERTIFICATION Registered Soil Scientist
Certified Professional Wetland Scientist

PROFESSIONAL AFFILIATIONS Society of Soil Scientists of Southern New England
Association of Massachusetts Wetland Scientists
Society of Wetland Scientists
Connecticut Association of Wetland Scientists (Charter Member)

**PUBLIC
SERVICE**

New Hartford, CT Planning and Zoning Commission
Member, 1987-1995

New Hartford Inland Wetlands and Watercourses
Commission

Member, 1986-1990

Vice-Chairman, 1990-1993

Chairman, 1993-1995

CERTIFICATION

I hereby certify that a copy of the foregoing document was delivered by first-class mail and e-mail to the following service list on the 15th day of March, 2011:

Carrie L. Larson
Paul Corey
Jeffery and Mary Stauffer
Thomas D. McKeon
David M. Cusick
Richard T. Roznoy
David R. Lawrence and Jeannie Lemelin
Walter Zima and Brandy L. Grant
Eva Villanova

and sent via e-mail only to:

John R. Morissette
Christopher R. Bernard
Joaquina Borges King


Denise L. Myron