



September 10, 2012

Dear Mr. Snook,

Please accept the following comments on the “North Springfield Sustainable Energy Project” air permit, offered on behalf of the Partnership for Policy Integrity.

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The facility rating in MWe does not match what has been filed at the PSB

The permit states (p. 2)

“The high pressure steam is directed to a multi-stage condensing steam turbine- generator, with a maximum gross electrical output of approximately 42.5 MWe. Due to internal energy demands, the Facility is designed to produce an average of approximately 37 MWe (net) for sale”

This does not match statements made to the PSB where the applicant has repeatedly stated that the facility will be between 25 and 35 MW in capacity. Wood use by the facility has been estimated based on a total capacity of 35 MW. The difference in wood use between a 42.5 MW plant and a 35 MW plant is substantial. This point needs to be clarified and the wood use numbers corrected if this plant is really going to be this large.

Potential to emit has been calculated incorrectly

Page 5 of the technical support document states,

The Permittee has not proposed any operating limits for the Boiler. However, the annual potential to emit calculations are based on an average heat input of 464 MMBtu/hr (vs. the maximum design heat input of 502 MMBtu/hr), for 365 days per year, so the permit will have an annual heat input limit of 4,064,640

MMBtu/yr. Assuming 4,500 Btus per pound of 45% moisture wood, this equates to approximately 451,627 tons/yr of wet wood fuel.

Page 6 of the technical support document states,

For the Boiler, the calculated allowable annual emissions of SO₂, NO_x, PM, CO and VOCs are based on the established emission limits expressed in lbs/MMBtu and an annual average maximum heat input of 464 MMBtu/hr.

This is not the correct way to calculate the potential to emit (PTE). The PTE is correctly calculated by multiplying the maximum heat input capacity of the boiler (502 mmbtu) by the maximum hours of operation (8760) by the emission rate of the pollutant.

The avoidance of correctly estimating PTE is explained on page 20 of the permit, which states that the heat input of the facility will be limited to 4,064,640 mmbtu per 12 month period. However, there is little evidence that this limit can be enforced. The ANR needs to specify in the permit exactly the means for enforcing this limit. In the more than 79 biomass facility air permits we have reviewed from around the country, we have not seen a similar instance where PTE was underestimated by downgrading the heat input to the boiler. If PTE is to be thusly downgraded, the restrictions in the permit must be practicably enforceable. These restrictions are not.

The two boiler capacity values are unconventional and confusing

The permit states (p. 3) that the boiler capacity size is both 464 and 502 mmbtu/hr:

Max Heat input

(45%moisture content wood):

464 MMBtu/hr

Max Heat input

(55%moisture content wood):

502 MMBtu/hr

This is confusing and unnecessary. In the many permits we have reviewed, we have not seen any other instance where the applicant submitted two boiler ratings. If the applicant wants to use the 464 mmbtu/hr rating, then they should install a boiler with a rating of 464 mmbtu/hr. Otherwise, the rating is 502 mmbtu/hr.

Stack height is inadequate

Good engineering practice for the stack height at NSSEP would be 290 feet, according to page 5-8 of the air permit application. However, according to testimony submitted by NSSEP to the PSB, the FAA has placed restrictions on the stack height of the facility. Page 19 states that the stack will be 140 feet in height. This facility is going to be located in a densely populated area. If the stack height can't be made maximally protective to disperse pollutants, then the facility should not be built in this area.

SIL and SIA modeling results are obfuscated and appear to have been misrepresented

The ANR should consider rewriting and explaining the following section so that it actually says what it is supposed to say. On page 7 of the permit, it states:

The following pollutants/averaging times were had (sic) predicted concentrations that were greater than their respective SIL: PM₁₀ 24-hr, PM_{2.5} 24-hr, PM_{2.5} annual, SO₂ 1-hr, SO₂ 24-hr and NO₂ 1-hr.

The interactive source modeling included the following two sources: APC Paper in Claremont, NH (SO₂ & NO₂) and Wheelabrator Claremont in Claremont, NH (SO₂ & NO₂). No nearby sources with significant emission rates of PM₁₀ or PM_{2.5} were identified.

But then on page 8, we are told:

For the 1-hr NO₂ and SO₂ standards it was necessary to identify the Facility's contribution to impacts at the receptors that had a total impact that is greater than the NAAQS. This analysis was done and it was determined that the predicted impacts from this proposed project at those receptors were well below the significant impact level. This review concluded that the Facility does not contribute to these predicted violations of the NAAQS.

So which is it? We are told on page 7 that several pollutant measures have “predicted concentrations that were greater than their respective SIL”, then on page 8 we are told that the predicted impacts are “well below” the significant impact level.

Then we are told in the table on page 9 that for the pollutants requiring cumulative source modeling, even though the NAAQS are already exceeded for the 1-hour NO₂ and SO₂ standards, not to worry, the contribution of NSSEP is so small, it does “not contribute” to the violations.

The public should not have to work this hard to interpret an air permit. This text is impenetrable, and the presentation of information conveys the impression that there is a problem with this facility's emissions, but they are hiding it. Worse yet, ANR signing off on a permit containing such confusing verbiage makes it look like ANR isn't minding the store. This permit needs work, and if ANR has the slightest doubt about the modeling results from the facility, they should require the modeling to be repeated, with the Agency supervising closely.

MSER for CO is not really the most stringent emission rate

Page 6 of the permit states that MSER for CO is 0.075 lb/mmBtu. This is not the most stringent emission rate. The air permit for the Palmer Renewable Energy facility, which also includes a Babcock and Wilcox boiler, has a 12 month CO emission rate of 0.0365 lb/mmBtu, achieved with use of an oxidation catalyst. Considering the location of the North Springfield facility, in close proximity to other businesses, etc, the ANR should require the MSER rate to *actually be* the “most stringent”. This would require use of an oxidation catalyst.

The VOC emission rate is unlikely to be achieved

NSSEP promises a VOC emission rate of 0.005 lb/mmBtu. The AP-42 standard emission rate for wood-fired boilers is 0.017 lb/mmBtu. In our database of biomass facility air permits, there are 30 facilities that specify a VOC emission rate. These rates range from 0.005 lb/mmBtu (only one has this rate - the Beaver Fair Haven facility) to 0.19 lb/mmBtu. The Palmer facility, which proposes to use an oxidation catalyst, was only able to promise to meet a rate of 0.01 lb/mmBtu, or twice the rate at the NSSEP plant. In other cases, for instance consideration of NO_x rates proposed for the Beaver facility in Fair Haven, ANR and the applicant have dismissed rates specified in the Palmer permit as unachievably low. However in this case, the limit proposed is only *one-half* that proposed at the Palmer plant, which intends to use control equipment that NSSEP will not use, and yet the applicant, and ANR, see no problem in proposing a rate that is much lower than that at the Palmer plant.

We assume that the applicant is not able to produce a vendor guarantee assuring the 0,005 lb/mmbtu rate for VOCs. Thus, if the Agency is content to sign off on emissions rates that are fantastically low, then it should at least provide some assurance that the inevitable excursions from this rate will be noted. This is particularly important since, as the table on page 15 informs us, VOCs are considered a proxy for emissions of organic Hazardous Air Contaminants.

As it stands now, a promise of “good combustion practices”, combined with absolutely no assurance that rates are met, does not constitute an enforceable limit in this permit. Page 28 of the permit specifies the continuous emissions monitoring systems that are proposed for the facility, but no monitoring for VOCs is included. Page 27 of the permit states that a boiler operating plan is to be developed and include startup/shutdown emissions of VOCs “developed from operational emission data from stack tests”. Since “good combustion practices” are the sole control proposed for VOCs, it is to be expected that SSM emissions can be large. Is ANR really suggesting that the facility should conduct stack testing during startup/shutdown events? If so, this should be specified in the permit, because the “initial” stack test for VOCs and “periodic compliance” tests that are currently specified will surely be conducted only under the most optimal combustion conditions and will not be reflective of actual emissions at the facility, which plans to have at least four cold starts a year, and may have more. The annual emissions should be estimated using realistic projections of how the plant is actually operated, and leave a buffer for unexpected events and malfunctions, as well.

The facility should be considered a major source for HAPs

The HAPs emissions limit of 25 tons appears to be unenforceable, both because HCl emissions will likely exceed 10 tons (discussed below) and because organic HAPs emissions have likely been underestimated significantly.

Organic HAPS emissions alone will likely exceed 25 tons

The use of a highly unrealistic VOC rate, then stack testing, only, of component organic HAPs like formaldehyde and benzene, essentially assures that spikes in emissions such as those that can occur during startup/shutdown will not be detected. EPA’s AP-42 emission rate under normal operation conditions for formaldehyde is 0.0044 lb/mmbtu, and for benzene is 0.0042 lb/mmbtu. Both have an “A” rating for quality. Combined, emission rates for these two pollutants, alone, would be 17.5 tons at the boiler rating of 464 mmbtu/hr, and 18.9 tons at 502 mmbtu/hr.

Calculated using the AP-42 factor and the correct boiler capacity, the PTE for VOC’s from this facility is around 37 tons. Can the applicant and ANR identify what component of the total VOCs does *not* qualify as HAPs? It seems likely that emissions of organic HAPs, alone, exceed 25 tons at this facility.

The absence of acid gas controls makes staying below 10 tons of HCl highly unlikely

The permit states, (p. 3)

“Acid gases (SO₂, H₂SO₄, and HCl) are limited by inherently very low sulfur and chlorine levels in the wood fuel, and further reductions in the boiler and fabric filter from natural alkalinity in the wood ash.”

The table on page 15 of the permit states that HMSER for acid gases is “*the use of natural wood which has an inherently low level of sulfur and chlorine*”.

However, we have not seen any estimate of the actual chlorine or sulfur content in the fuel that NSSEP will be using. Why is ANR allowing them to rely on this general statement?

To stay below an emission rate of 10 tons per year of HCl, the facility would need to **continuously meet** an emission rate no higher than 0.0045 lb/mmbtu (if the PTE is correctly calculated using a boiler capacity of 502 mmbtu/hr) or 0.0049 lb/mmbtu using the incorrect PTE calculation that the applicant appears to prefer, where the boiler capacity is stated as 464 mmbtu/hr. Notably, the permit does not acknowledge that this is the actual HCl emission rate that must be achieved – this information is nowhere to be found.

The applicant is not going to achieve this rate without an acid gas control system. In responses to interrogatories before the PSB, when questioned upon what basis the applicant thought they could achieve such a low rate of HCl emissions, they answered (response to 1-108 to NoSag):

For HCl, NSSEP proposed an emission rate of 8.34E-04 lb/MMBTU based on two recent permits, the Laidlaw Berlin BioPower project in NH found here:

<http://www2.des.state.nh.us/OneStopPub/Air/330079013711-0151TypePermit.pdf>,

and the PRE project in Springfield, MA found here:

http://www.mass.gov/dep/public/hearings/precpa_en.pdf.

NESEEP has not yet entered into vendor contracts for the Project. The emission rate was chosen as representative of MSER based on the other recent permits mentioned above.

Both the biomass plants cited by the applicant are using sorbent systems for acid control. Therefore, it is not reasonable for NSSEP, which is not using a sorbent system, to cite these rates as achievable. Further, in our own database of over 70 recently issued air permits for biomass facilities around the country, we found that sorbent injection is more common than not. In fact, a number of facilities with boilers one half or less the capacity of the NSSEP boiler propose to use sorbent systems for acid gas control. There is nothing special about the NSSEP facility other than the inexperience of the developer. Acid gas control systems are now standard in the industry. Why is ANR not requiring one?

Since the facility is not using a sorbent system for acid gas control, it is reasonable to use the AP-42 emission factor for HCl to estimate emissions. This factor is 0.019 lb/mmbtu. We checked the validity of this emissions factor against the emissions database that EPA put out in December 2011 when they issued the boiler rule. This database contains hundreds of datapoints on fuel Cl content, which is then converted to HCl emissions, and also emissions data for HCl that is directly measured.

- For the HCl rates that are estimated based on fuel chlorine content, we pulled 772 estimates for different types of “unadulterated” wood fuel, hog fuel, and bark. The average HCl emission rate calculated in this database from fuel Cl content using standard assumptions for the higher heating value of fuel is 0.026 lb/mmbtu.
- For the HCl emissions rates that are directly measured, where the fuel is specified as unadulterated wood, hog fuel, and bark, there are 107 datapoints with an average emission rate of 0.00928 lb/mmbtu. Using this emissions rate, the NSSEP facility would have 18 – 19 tons of HCl emissions per year, making the facility a major source for HAPs. Interestingly, the AP-42 value of 0.019 lb/mmbtu occurs right around the midpoint of this dataset – in other words it is the median value.

The size of the boiler emissions database, and the fact that the data were collected within the last 7 years or so, makes this a credible means of estimating emissions. In fact, what the data show is that the AP-42 value of 0.019 lb/mmbtu is very reasonable. So why has NSSEP been allowed to choose their own emissions factor for HCl?

The applicant has consistently underestimated HAPs emissions

We have reviewed the actual data that lies behind the AP-42 estimates of HAPs, and we have reviewed hundreds of test results for boilers burning unadulterated wood in EPA’s December 2011 boiler database underpinning the new MACT rules. Similarly, we have reviewed the data that lies behind the NCASI emission factors (much of which is the same as the AP-42 dataset). The applicant has in some cases cherry picked data to eliminate datapoints that they don’t like and that they identify as “outliers”, even though they used no statistical test to identify them as such, and has invented new emissions factors. For nearly every HAP emitted in any significant amount, the applicant has chosen or invented an emission factor that is significantly lower than the AP-42 factor. The use of these factors has not been justified, and is particularly unjustified given that the applicant is not using emissions controls, such as a sorbent system for acid gas control, that are absolutely standard on most other biomass facilities being built today.

When AP-42 factors are used, this facility is a major source of HAPs. ANR should permit it as such. Even if Vermont’s rules mandate emissions controls that are as rigorous, or more rigorous, than the control levels mandated by EPA for major sources under MACT, it reflects poorly on ANR to allow misrepresentation of this facility as a minor source for HAPs to go unchallenged. Further, it is a misrepresentation to the community, who have a right to know the amount of toxic air pollutants emitted.

Substance	AP-42 emissions factor	NSSEP emission s factor	NSSEP EF				exceeds action level?	
			lower or higher than AP-42 EF?	tons w AP-42 EF at 464 mmbtu	tons w NSSEP EF at 464 mmbtu	tons w AP-42 at 502 mmbtu		tons w NSSEP EF at 502 mmbtu
HYDROCHLORIC ACID	1.900E-02	8.34E-04	lower	41.111	1.805	41.776	1.834	Y
FORMALDEHYDE	4.400E-03	1.20E-03	lower	9.520	2.596	9.675	2.639	Y
BENZENE	4.200E-03	8.50E-04	lower	9.088	1.839	9.235	1.869	y
ACROLEIN	4.000E-03	2.40E-04	lower	8.655	0.519	8.795	0.528	no AL
STYRENE	1.900E-03	6.40E-04	lower	4.111	1.385	4.178	1.407	N
MANGANESE	1.600E-03	8.60E-05	lower	3.462	0.186	3.518	0.189	Y
TOLUENE	9.200E-04	2.90E-05	lower	1.991	0.063	2.023	0.064	N
ACETALDEHYDE	8.300E-04	1.90E-04	lower	1.796	0.411	1.825	0.418	Y
DICHLOROMETHANE	2.900E-04	5.40E-04	higher	0.627	1.168	0.638	1.187	Y
ACETONE	1.900E-04	2.20E-04	higher	0.411	0.476	0.418	0.484	N
NAPHTHALENE	9.700E-05	1.60E-04	higher	0.210	0.346	0.213	0.352	Y
PHENOL	5.100E-05	5.10E-05	same	0.110	0.110	0.112	0.112	N
LEAD	4.800E-05	4.800E-05	same	0.104	0.104	0.106	0.106	Y
CARBON TETRACHLORIDE	4.500E-05	8.90E-07	lower	0.097	0.002	0.099	0.002	N (but 60%)
				Sum	Sum	Sum	Sum	
				81.293	11.011	82.610	11.189	

The discussion of BACT for greenhouse gases is inadequate

We are offering only brief comments here. ANR knows that biomass plants that rely on whole tree harvesting for fuel are the worst possible choice from a climate change perspective. To use wood for fuel produces a spike in CO2 emissions that is not “repaid” with new tree growth for decades. We do understand that ANR’s role is to write a permit, not to make substantive decisions about what the role of biomass energy

should be in Vermont, but at the same time, when ANR allows sloppy language and misrepresentations by the applicant to go unchallenged, this reflects poorly on the Agency and makes decision-making more difficult for policy-makers who rely on ANR for unbiased science. For instance, the following is an example of the kind of propaganda that the applicant provides to policy-makers. In a letter to members of the Planning Commission and Board of Selectmen (Exh. Pet CGM-6 provided to the VT PSB) the NSSEP project manager states, *“The Project will also help Vermont meet its electric energy needs with a clean, low carbon, renewable baseload source of power”*. This statement reminds me of something one famous writer once said about another famous writer: “every word is a lie, including ‘and’ and ‘the’”.

ANR’s discussion of why the use of wood is “integral” to a power generation project is so weak, it reflects particularly poorly on the Agency. In its review of the Beaver Fair Haven plant, ANR justified wood as “integral” to power generation at the facility because the facility would, as a pellet plant, generate wood waste that would constitute some of the fuel supply at the power plant. However, that argument does not pertain to the NSSEP facility, and the Agency’s argument for why wood is “integral” to the NSSEP facility. ANR’s remaining justifications for why wood is “integral” to the NSSEP facility are not much more than a tacit admission that the sole purpose of the facility is to mop up subsidies for “renewable” power generation, something that they would not be able to do if they were burning natural gas, for instance.

ANR argues that the GHG analysis and discussion of BACT should not require the facility to consider other fuels and technologies, because this would constitute “redefining the source”. These arguments are shallow.

1. The NSSEP technical support document contains elements of the BACT analysis for greenhouse gases, such as it is. The following statement is found on page 32: *“ 4. Type of fuel. Due to their chemical makeup, some fuels generate less CO2 per unit of energy when they are combusted. As noted above, fuel switching would redefine this source and is not part of the MSER review.”* This statement is deceptively incomplete. A major reason that a biomass plant emits so much more CO2 than a coal plant, for instance, is *not* because the fuel carbon to energy ratio is so much higher (in fact coal and wood have a similar carbon to energy ratio) but because biomass plants are phenomenally inefficient. It is ludicrous to permit a technology as inefficient as biomass combustion to constitute “BACT” for CO2 control.
2. Saying “The Agency finds that the Permittee’s objective is to build a biomass fuel electric generating facility” is no different from saying their objective is to build a coal facility. In that case, the applicant would likely still be compelled to consider alternate fuels and technologies, particularly if other fuels were in use at the plant, for instance during startup.
3. The statement *“The Agency further notes that the proposed facility is designed to allow low grade heat from the steam turbine at the electric generating plant to supply thermal energy for the adjacent industrial park”* is irrelevant to the nature of the fuel used. Low grade heat could be harvested from any kind of facility powered by any kind of fuel. It does not reflect well on the Agency to include this argument as a reason that wood is “integral”.

The INRS fuel availability study misrepresents supply; wood supply is inadequate

On page 31, referring to the use of wood at the facility, the technical support document states that NSSEP’s testimony *“also discusses promoting sustainable forestry and the intent of this project to develop its own Sustainable Forestry Plan. In the development of the project they also hired Innovative Natural Resource Solutions, LLC to conduct a biomass fuel supply study for the area around Springfield, VT. The Permittee points to this study, along with a recent study by the Biomass Energy Resource Center (Vermont Wood Fuel Supply Study – 2010 Update), to support their conclusion that there is an ample supply*

of wood fuel available. The Permittee has reiterated that the project is proposed as a wood fired steam electric boiler, and the choice of fuel is integral to the proposed facility's fundamental purpose and basis of design."

Citing the INRS studies on fuel availability as support for the applicant failing to do a real BACT analysis is no different than a coal plant saying, "we have coal in the mines, therefore we should not have to consider other fuels." Further, ANR itself knows that the INRS/Kingsley biomass availability studies are quite weak in their methodology and conclusions. Citing the existence of the INRS study is therefore not very meaningful.

Here we offer a few observations on the INRS study. A more detailed critique is included in the supporting document provided with this letter.

The inadequacy of the Kingsley studies is manifested in some of the responses to interrogatories before the PSB. Below we have reproduced some questions and responses demonstrating that the study -

1. ...did not consider landowner willingness to harvest;
2. ...did not take physical considerations like slope steepness into consideration when calculating harvestable area and wood availability;
3. ...did not take protected areas or wetlands into consideration when calculating harvestable area and wood availability;
4. ...states they "don't know" whether compliance with a sustainable harvest policy will reduce wood availability - even though the INRS study for NSSEP explicitly states that any restrictions would "likely" increase the cost of fuel;
5. ...appears to be confused on whether the harvest radius is 30 miles or 50 miles, and uses whatever answer is convenient at the time;
6. ...claims greater wood availability than exists according to the BERC wood availability study.

Q.VNRCNWF:NSSEP.I-73: Please explain whether the Biomass Fuel Availability study incorporated landowner willingness to harvest as a factor in determining overall material that may be available to harvest.

A.VNRCNWF:NSSEP. 1 -73 :

- a. Landowner willingness to harvest was not a factor used in wood supply estimates.
- b. The assessment does not include an analysis of landowner willingness to harvest.

Q.VNRCNWF:NSSEP.1-75: Please explain whether the Biomass Fuel Availability study incorporated limitations in availability of wood supply due to protection of wetlands and other sensitive ecosystems?

a. Please explain how sensitive ecological sites affect or factor into the wood supply estimates provided?

A.VNRCNWF:NSSEP.I-75: With the exception of excluding all public lands, including the Green Mountain National Forest, wetlands and other sensitive ecological sites were not screened from the wood supply analysis.

Q.VNRCNWF:NSSEP.I-76: Please explain whether compliance with the NSSEP Sustainable Harvesting Policy for Whole Tree Chipping Operations will reduce the amount of wood that is available according to the Biomass Fuel Availability study? If compliance with the Sustainable Harvesting Policy for Whole Tree Chipping Operations will reduce the amount of wood that is available, please explain how much?

A.VNRCNWF:NSSEP.I-76 Unknown. See also A.ANR:NSSEP. I – 10

Contrast this answer of “Unknown” with the following statement from the INRS study for NSSEP, which states that fuel prices in the study “*assume that no outside restrictions are put on timber harvesting for biomass. The two facilities currently operating in Vermont – McNeil Station and Pinetree Ryegate – have ‘harvest standards’ placed on the facilities through the Vermont Public Service Board. **If the PSB or the legislature placed harvest standard restrictions on new biomass electric facilities located in Vermont – or if the North Springfield Energy Project adopts such standards voluntarily – it is likely the cost for fuel would increase***”. (INRS North Springfield report, Table 5, page 34)

In Exh. Pet CGM-6, the 45-day letter dated June 27,2011 states: "*The wood fuel would be procured within a 50 mile radius principally in southern Vermont, Southwestern New Hampshire and Northwestern Massachusetts, with the greatest focus being on supporting the forest economy in Windsor and Windham Counties...*"

Q.AAFM:NSSEP.1-32: Exh. Pet. RWH-2 at page 18 states: "The plant will be purchasing \$14.7 million in forest products from loggers operating within a 50 mile radius of the plant."
List all counties by state that fall within a 50 mile geographic radius.

A.AAFM:NSSEP.1-32:

-Vermont
Bennington
Rutland
Windham
Windsor
Orange
Addison

However, elsewhere, they claim the wood supply radius is 30 miles. From the NoSag interrogatories:

Q.NoSag:NSSEP.1-171: What assumptions did INRS make about biomass availability (harvesting residues and standing low-grade wood that could be harvested for biomass) in Caledonia, Orange, and Windsor counties, Vermont?

A.NoSag:NSSEP.1-171: Because they are outside the 30-mile area of analysis, INRS assumed no supply from Caledonia and Orange Counties, Vermont. For Windsor County, the annual growth of non-sawlog woody material, less harvest and mortality, was assumed to be available. Additionally, half of the forest residue was assumed to be available.

However, they are ignoring BERCC's 2010 update of its wood supply study, which states (page 31) :
"Caledonia County has no remaining NALG wood, little remains in Orange, and surprisingly little remains in Windsor given the large forested land area."

Thank you for the opportunity to comment.

Sincerely,

Mary S. Booth, PhD.
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