

Massachusetts Environmental Energy Alliance

www.massenvironmentalenergy.org

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Re: Palmer Renewable Energy, EEA#14243

November 2, 2010

Dear Ms. Buckley,

Please consider these comments on the Palmer Renewable Energy Notice of Project Change. Please consider this letter as a request that a full Environmental Impact Review be required for this project.

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AIR POLLUTION IMPACTS OF THE PALMER FACILITY HAVE BEEN UNDER-REPRESENTED

A LARGE DECREASE IN NO_x AND CO EMISSIONS FROM THE PREVIOUS APPLICATION IS NOT EXPLAINED

The most obvious change in the NPC from the prior application is the replacement of a mixture of green fuel and construction and demolition waste with the supposition that 100% green wood will be used as fuel, perhaps supplemented with some pallets. This change is accompanied by a slight reduction in the amount of power to be generated at the plant, a minor decrease in emissions of hazardous air pollutants, and an extremely large decrease in projected emissions of NO_x and CO.

Little explanation is given for what underlies the change in emissions, which obviously affects the project's status for the project DEP's Emission offsets and nonattainment review program, conveniently placing the applicant just below the thresholds for consideration as a major source, which are set at 50 tons for NO_x and 100 tons for CO. By staying below these thresholds, the applicant is ensuring that requirements such as the purchase of NO_x offsets are avoided. It is thus important to scrutinize the assumptions behind this modeling carefully.

Emissions from the old application

Massachusetts Department of Environmental Protection
 Bureau of Waste Prevention – Air Quality
BWP AQ 02 Non-Major Comprehensive Plan Approval
BWP AQ 03 Major Comprehensive Plan Approval
 Comprehensive Plan Approval Project Summary Application

X224282
 Transmittal Number

Facility ID (if known)

B. Applicability (cont.)

Air Containment*	Current Potential Emissions (TPY)** (after control)	Actual Baseline Emissions (TPY)	Proposed Potential Emissions (TPY) (after control)
Particulate, PM ₁₀ /PM _{2.5}	N/A	N/A	44.6
SO _x	N/A	N/A	44.6
NO _x	N/A	N/A	133.8
VOC	N/A	N/A	22.3
HOC	N/A	N/A	N/A
Lead	N/A	N/A	0.35
CO	N/A	N/A	156.1
HAP	N/A	N/A	14.6
Other	Ammonia	N/A	13.4

*Complete only for air quality contaminants that will be affected by this project.
 **TPY = tons per year

2. Is this project subject to:

- 310 CMR 7.00 Appendix A- Nonattainment Review? Yes No

If yes, also complete section C- Nonattainment Review.

- Was netting used to avoid applicability? Yes No

Emissions from the new application

Massachusetts Department of Environmental Protection
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Facility ID (if known)

B. Applicability (cont.)

Air Containment*	Current Potential Emissions (TPY)** (after control)	Actual Baseline Emissions (TPY)	Proposed Potential Emissions (TPY) (after control)
Particulate, PM ₁₀ /PM _{2.5}	N/A	N/A	45.1/44.64
SO _x	N/A	N/A	44.6
NO _x	N/A	N/A	49.49
VOC	N/A	N/A	22.3
HOC	N/A	N/A	N/A
Lead	N/A	N/A	0.045
CO	N/A	N/A	99.5
HAP	N/A	N/A	13.9
Other	Ammonia	N/A	13.4

*Complete only for air quality contaminants that will be affected by this project.
 **TPY = tons per year

2. Is this project subject to:

- 310 CMR 7.00 Appendix A- Nonattainment Review? Yes No
 If yes, also complete section C- Nonattainment Review.
- Was netting used to avoid applicability? Yes No

In fact it is not immediately apparent why there is such a large decrease in NOx and CO, particularly since the modeling for this project actually should not have changed very much from the previous application, if at all. In the previous application submitted by the developer, revision of June 29, 2009, it states on AQ CPA-1 page 4 of 9 that “annual wood fuel limit assumes 100% green wood as a worst case”. This section is pasted here:

Proposed Fuel Restriction

Enter amount and units (gallons, cubic feet, etc.)

	Unit 1	Unit 2	Unit 3	Unit 4	Total
a. Maximum per month:					
primary fuel	38,000 tpm	_____	_____	_____	_____
auxiliary	2.6 MMSCF gas	_____	_____	_____	_____
b. Maximum per year:					
primary fuel	432,226 tpy	_____	_____	_____	_____
auxiliary fuel	18.2 MMSCF gas	_____	_____	_____	_____

2. Describe any other physical or operational limitation on the capacity of the equipment to emit a pollutant, including air pollution control equipment, restriction on hours of operation, etc., that will be used to restrict emissions:

Air pollution control system includes Turbosorp scrubber, fabric filter, Regenerative SCR and oxidation catalyst.

Natural gas usage for startup of boiler is based on 127 MMBTU/hr for 40 hours per year equivalent full load hours and 1.5 MMBTU/hr in the RSCR for 8,760 hours per year for a total of 18,220 MMBTU/yr. This assumes 4 cold starts and 12 hot starts per year. Monthly based on 2 cold and 2 hot starts.

Annual wood fuel limit assumes 100% green wood as a worst case.

Presumably, the NPC also models 100% green wood as a worst case. The same section of form AQ CPA-1 in the NPC looks similar, with the same amount of fuel burned:

Proposed Fuel Restriction

Enter amount and units (gallons, cubic feet, etc.)

	Unit 1	Unit 2	Unit 3	Unit 4	Total
a. Maximum per month:					
primary fuel	38,000 tpm	_____	_____	_____	_____
auxiliary	2.6 MMSCF gas	_____	_____	_____	_____
b. Maximum per year:					
primary fuel	432,000 tpy	_____	_____	_____	_____
auxiliary fuel	18.2 MMSCF gas	_____	_____	_____	_____

2. Describe any other physical or operational limitation on the capacity of the equipment to emit a pollutant, including air pollution control equipment, restriction on hours of operation, etc., that will be used to restrict emissions:

Air pollution control system includes Turbosorp scrubber, fabric filter, Regenerative SCR and oxidation catalyst.

Natural gas usage for startup of boiler is based on 127 MMBTU/hr for 40 hours per year equivalent full load hours and 1.5 MMBTU/hr in the RSCR for 8,760 hours per year for a total of 18,220 MMBTU/yr. This assumes 4 cold starts and 12 hot starts per year. Monthly based on 2 cold and 2 hot starts.

Annual wood fuel limit assumes 8,760 hours of operation at 100% load, which is conservative.

It is thus puzzling how, if the modeling was done for 100% green wood in the June 2009 application, and is also done for 100% green wood in this application, how the emissions of NOx and CO can have changed so dramatically.

CONTROL TECHNOLOGY PARAMETERS DO NOT MATCH STATEMENTS IN THE PREVIOUS AIR PLAN APPLICATION

With regard to the reduction in NOx emissions, one difference between the two applications does emerge. Apparently, the temperature at which the NOx removal technology was found to be most efficacious changed in the period between the two applications. The June 29 2009 application states (page : 4-5, page 44 of the pdf):

SCR

Activity of the SCR catalyst is a function of temperature, with 600-800°F being the typical range for high NOx removal efficiency. This "hot-side" application, with the SCR catalyst located prior to the air heater, in a boiler system has been the traditional placement in coal-fired boilers. However, exposure of the catalyst to wood ash rapidly deactivates it.

However, the new application states (page 4-3, page 71 of the pdf):

SCR

Activity of the SCR catalyst is a function of temperature, with 400-700°F being the typical range for high NOx removal efficiency. This "hot-side" application, with the SCR catalyst located prior to the air heater, in a boiler system has been the traditional placement in coal-fired boilers. However, exposure of the catalyst to wood ash rapidly deactivates it.

In the first application, the SCR catalyst was said to operate best at 600 – 800 degrees; in the new application, it is said to operate at 400 – 700 degrees. Which is true? This difference is important; the transition to burning 100% green wood means that moisture content will be much higher, and emissions are likely to be cooler, due to the energy required to evaporate moisture in the wood. All other things being equal, this is an unavoidable consequence of burning wetter fuel.

Both applications state that the plant will use NOx controls located after the baghouse. The old application states (page 2-5, page 14 of the pdf):

Babcock Power Environmental has developed the RSCR, a "tail-end" or "cold-side" SCR, located after the baghouse, where the gas temperatures are far below the operating temperatures for conventional SCR catalysts. A key consideration of the system is to elevate the flue gas temperature to approximately 650°F while minimizing auxiliary energy input.

The new application (p. A-3, page 26 of the pdf) has renamed the RSCR to HRSCR, but the actual technology does not appear to have changed:

feasible for a wood fired boiler as explained in the BACT analysis in Appendix C. Instead an HRSCR is proposed following the fabric filter (cold-side SCR) for NO_x removal.

I do not pretend to understand the intricacies of emissions controls, and whether the technologies proposed in the June 29 2009 application and this more recent NPC are actually the same, or not. However, what is clear is that the removal efficiency is stated to have changed:

From the old application, which promises 0.06 lbs NO_x/MMBtu:

PRE also proposes to utilize RSCR to achieve 0.06 lbs NO_x/MMBtu (1 hr avg) and 0.006 lb NH₃/MMBTU (1-hr avg) (13 ppm NH₃ @ 3% O₂). The RSCR will be located downstream of a fabric filter, with upstream humidification and dry scrubber minimizing the potential for char carry-over and fire in the filter.

Thus PRE is proposing NO_x control that is the most stringent of any permitted facility in the U.S. and considers this to comprise BACT and LAER for NO_x.

Contrasting with the new application, which promises a rate of 0.055 lbs NO_x/MMBtu

PRE proposes to utilize HRSCR, but to achieve 0.055 lbs NO_x/MMBtu (1 hr avg) , and 0.0222 lb/MMBTU (annual avg, 12 consecutive months) and 0.006 lb NH₃/MMBTU (1-hr avg) (13 ppm NH₃ @ 3% O₂). The HRSCR will be located downstream of the fabric filter.

Thus PRE is proposing NO_x control that is the most stringent of any permitted facility in the U.S. and considers this to comprise BACT for NO_x.

Perhaps this decrease in emissions from the 0.06 lb/NO_x MMBtu stated in the first application and the 0.055 lb NO_x/MMBtu in the NPC. can be ascribed to the transition from dry, hot-burning fuel in the first application, which might be assumed to emit more NO_x, to cooler-burning, wetter fuel in the second application. But the first application stated that the assumption of 100% green fuel had been modeled as a worst-case scenario, so in fact, one would expect the control efficiencies in the two applications to look more similar. DEP and MEPA should enquire of the applicant: since nothing about the control technology between the two applications has changed, why is the applicant claiming a lower emissions rate in the NPC?

THE NPC SIGNIFICANTLY UNDERREPORTS FUEL USE AND POLLUTANT EMISSIONS

In any case, the emissions figures presented by the applicant are demonstrably wrong because the amount of fuel that will be burned at the facility has been significantly underrepresented. In fact, the applicant has under-

represented the amount of wood that will be burned at the facility in two ways, first, by assuming a moisture content of 40% for the fuel, and then by using the higher heating value of this fuel to estimate the amount of energy that can be generated at the facility. This means that not only will the project emit more of every conventional pollutant and hazardous air pollutant, but it will also emit more carbon dioxide than stated; thus, the greenhouse gas analysis presented in the NPC is also not correct.

The NPC states in Attachment II that the project will require 388,944 tons of green wood chips (GWC) per year:

Attachment II

BASELINE

POWER PLANT CO ₂ STACK EMISSIONS		
ASSUMPTIONS		
annual capacity factor	90%	
GIVEN		
GHG Emission Rate	195 lb/MMBtu	AP-42
GWC Use	1,184 tpd	
GWC heat value	5160 Btu/lb HHV	
CALCULATION		
GWC annual use	388,944 tpy	
Annual Stack Emissions	391,355 tpy CO ₂	

And page 4-6 of the NPC states,

“PRE will be green wood, with a moisture content range of 30-50%, with an average of about 40%” [sic].

Indeed, the higher heating value of wood at 40% that has a bone dry energy content of 8,600 btu/lb (a common assumed value) is 5,160 btu/lb, as the applicant assumes above.

USE OF THE HIGHER HEATING VALUE CAUSES ACTUAL FUEL USE TO BE UNDER-REPRESENTED

It is not correct to use the higher heating value to determine fuel use at the facility unless the energy output is down-adjusted to take into account the energy dedicated to evaporating water in the fuel. Either the facility will deliver 35 MW to the grid, or it will burn the amount of fuel stated in the application, but it cannot do both. As stated in one of the definitive references on biomass energy,¹

¹ ORNL Biomass Energy Data Book, Version 2, page 175.

[1] The lower heating value (also known as net calorific value) of a fuel is defined as the amount of heat released by combusting a specified quantity (initially at 25°C) and returning the temperature of the combustion products to 150°C, which assumes the latent heat of vaporization of water in the reaction products is not recovered. The LHV are the useful calorific values in boiler combustion plants and are frequently used in Europe.

The higher heating value (also known as gross calorific value or gross energy) of a fuel is defined as the amount of heat released by a specified quantity (initially at 25°C) once it is combusted and the products have returned to a temperature of 25°C, which takes into account the latent heat of vaporization of water in the combustion products. The HHV are **derived only under laboratory conditions**, and are frequently used in the US for solid fuels.

What this is saying is that of the total btus inherent in wood fuel, some portion of those btus are required to drive off moisture in the fuel before useful energy can be obtained. The energy required to evaporate the moisture in the fuel can theoretically be recovered as useful heat available to do work, but only under ideal conditions where water is re-condensed and the energy of condensation compensates for the energy that was subtracted during evaporation. However, the water evaporated in the boiler is not recondensed – because that water is lost out the stack, or it reacts with other emission products. The lower heating value takes this effect into account and “counts” only those btus in wood that are actually available to generate heat and drive the turbine after the moisture in the fuel has been evaporated. The higher heating value treats all energy in the wood as if it is available to do useful work. By employing the higher heating value of wood to calculate the amount of fuel that will be burned, the NPC over-estimates the amount of useful energy available for generating power, and thus underestimates actual fuel use. By underestimating fuel use, the application underestimates emissions.

THE MISSTATEMENT OF WOOD MOISTURE MEANS ACTUAL FUEL USE IS UNDER-REPRESENTED

By representing wood fuel as having a low moisture content of 40%, the NPC under-represents the amount of fuel that will be burned at the Palmer plant and over-represents the energy that can be obtained from that fuel. The moisture content of green wood should be considered to be at a minimum 45%, not 40% as the NPC assumes. Here are three examples from various sources to demonstrate the industry standard for wood moisture is at *least* 45%:

The USDA Forest Products Laboratory “TechLine”² sheet states that wood moisture is about 50%:

The concept of latent heat of vaporization is important to understand in order to know the useful energy available from any type of fuel that contains water, including wood, coal, and peat. In wood or wood products, this water is referred to as moisture content (MC). **Commonly,**

² USDA Forest Products Laboratory, 2004. Fuel value calculator (FPL WOE-3).

water makes up half the weight of a living tree and, if wood is used for fuel, its MC is a factor in determining its energy value.

The following is copied from a short paper put out by Juca, the domestic wood heat appliance maker (available at <http://mb-soft.com/juca/print/311.html>). It states wood moisture is about 50%:

It is also useful to note how these concepts apply to un-seasoned (green) wood fuel. If only seasoned a short time, **50% moisture is a realistic figure**. Then a two-pound piece has one pound of wood fibers (worth 8660 Btu). There will be 1.54 pounds of water to vaporize and heat up (taking away 2200 Btu). The two-pound piece has a net available energy content of 6460 Btu or 3230 Btu/pound. This is only HALF of the available energy present when burning seasoned wood. Green wood consumes the bulk of its energy just to keep itself going, and is obviously subject to easily going out. A freshly cut tree has even higher moisture content, often above 60%. Similar calculations show that this fresh wood has only 2000 Btu/pound of energy available. This explains why it is so difficult to burn freshly cut trees.

And from an article in Biomass Magazine³ states that wood moisture is 45% - 50%:

A common industry practice is to measure in terms of green tons, which are **generally assumed to possess a moisture level of 45 percent to 50 percent**.

Presumably, wood will be stored outdoors at the off-site storage area prior to transport to the shed at the facility, and thus exposed to rain and snow. Additionally, the NPC states that a “permanent on-demand misting system will be installed on the stackout conveyer to moisten the surface of the fuel as it drops on the pile” to mitigate dust generation. The moisture content of the fuel will thus be increased even further.

Combining the fact that the applicant has underrepresented the moisture content in the fuel, and incorrectly employed the higher heating value, the actual wood use by the project will be significantly greater than claimed in the NPC. Assuming 45% moisture content and employing the lower heating value of wood results in a figure of 490,135 tons per year that would be required by the facility if it were operating at 90% capacity. This is 26% percent greater than the figure of 388,944 tons per year that the proponent claims will be burned at the plant. Given that the efficiency of pollution control devices and procedures is fixed at removing a certain percentage of the pollution emitted by combustion, this means that when more fuel is burned, proportionately more pollution is emitted. In light of this very serious discrepancy between the stated fuel use by the NPC and the actual fuel use that would be required to fuel the plant to deliver 35 MW to the grid, the estimates of NOx and CO emissions, falling just barely short of triggering major source status for this facility, cannot be accepted by DEP and MEPA.

³ <http://www.biomassmagazine.com/articles/3619/bcap-rule--revision/>

The discrepancy between stated fuel use and actual fuel use may be even greater than just that caused by the misstatement of fuel moisture and the incorrect use of the higher heating value for fuel. The NPC *also* appears to under represent the parasitic electrical load at the plant, claiming that parasitic load will be about 8% of total power generation. If this is the case, then actual generation at the plant would be around 38 MW. However, every plant application I have reviewed admits that there is around a 10% parasitic load required by facility operations. As an example, the final environmental impact report for the Russell plant (which would be water-cooled and would thus not experience the additional power requirements of air cooling as the Palmer plant will) states⁴

The gross power generated must exceed the net power output by the amount of the auxiliary (internal) loads expected within the plant that are required to operate the plant. (Net power output = Gross power generated – Internal plant auxiliary load). Therefore, in order to generate the specified design net output of 50 MW, the turbine-generator must produce at least a gross power generation of 55 MW.

The Palmer facility will employ air cooling, which entails a significant additional energy cost. The draft environmental impact report prepared for the Russell plant⁵ lays out the reasons:

Air cooling can be significantly less energy efficient compared to wet cooling. This results in a higher fuel input requirement to maintain an equivalent net plant output of 50 MW, or a lower net plant output for the same fuel input. Associated with this reduced net plant efficiency, and therefore increased fuel consumption, is a corresponding increase in the mass of air emissions per kilowatt of electricity delivered to the grid... This difference in performance can translate to 4 to 8% more fuel to achieve the same output. Therefore this design would require increased truck traffic to the site for fuel delivery to sustain the same output.

If these numbers are representative, and the energy required to run the air cooling system is additive to the other power demands at the plant, the actual parasitic load at the Palmer plant could be 12% to 16% instead of 8%. Given the energy demands presented by air cooling at the Palmer facility, it is likely that the parasitic load is a greater proportion of total power output than that at the Russell plant. It is extremely unreasonable to expect it to be a *smaller* percentage than at the Russell plant.

Even without taking the energy demands of the air cooling system into consideration, the Palmer facility will burn at least 26% more wood than is stated in the NPC, as established above; including the extra fuel use required to meet the air cooling power demand, it is quite possible that the plant could burn around 30% more wood than stated. More wood burned means proportionately more pollution, thus it is extremely improbable that emissions of NOx would stay below 50 tons and emissions of CO would stay below 100 tons. If the initial estimates of NOx and CO emissions in the NPC are accepted (and I think they are extremely questionable to

⁴ Russell Biomass FEIR, page 3-3

⁵ Page 5-23 of the DEIR

begin with), adjusting these emissions upward by 30% would result in the project emitting 58 tons of NOx and 129 tons of CO.

FUEL USE AND EMISSIONS HAVE NOT BEEN CORRECTLY ASSESSED USING POTENTIAL-TO-EMIT

It is interesting to note that the proponent has taken into account the 90% capacity factor in the fuel use and CO2 emissions figures presented above, down-adjusting the totals to reflect the amount of time that the plant will ostensibly not be operating. I was not aware this was permitted – my impression has been that *all* emissions and calculations of fuel use are generally estimated based on the potential to emit, which calculates standard emissions as if the plant was operating 24 hours a day, 365 days a year.

The applicant notes that the Palmer plant will not be subject to the Prevention of Significant Deterioration (PSD) program and EPA's implementation of the Greenhouse Gas Tailoring Rule, because the project plans to begin construction before EPA's July 1, 2011 implementation date. However, this is likely incorrect, for two reasons, and if proved incorrect, the applicant will be required to correctly calculate the potential to emit carbon dioxide and other pollutants, using the 24 hrs/365 days approach. First, it is quite possible this project will not begin construction prior to EPA's tailoring rule enforcement deadline of July 1, 2011. It is not up to the applicant to decide when or if this project goes forward. Second, the applicant has significantly under-represented emissions of other pollutants covered under the Clean Air Act, and it is clear that the facility is in fact a major source for CO and NOx, and as such, will be subject to the PSD program for all pollutants, including CO2. DEP and MEPA should thus require that the applicant take all necessary steps now to correctly represent their fuel use and CO2 emissions, to avoid regrets later. A full environmental impact report would be the ideal place for the applicant to explore these numbers.

PALMER MAY NOT MEET REQUIREMENTS OF THE OFFSETS AND NONATTAINMENT REVIEW PROGRAM

Given that the Palmer facility will emit more than 50 tons of NOx a year, the facility will be required to purchase offsets, as had been planned in the former air application. Lifting a section from the draft air permit issued on this project in its first incarnation as a C&D burner, the significance of the requirements is clear:

PRE is subject to the Massachusetts Emission Offsets and Nonattainment Review regulations of 310 CMR 7.00, Appendix A since the facility is located in a nonattainment area for ozone and has the potential to emit greater than 50 tons per year of NOx (a precursor pollutant to ambient ozone). Therefore, the proposed NOx emissions must satisfy the LAER requirements of the regulations. Pursuant to 310 CMR 7.00 Appendix A (8)(b), PRE is required to demonstrate that the benefits of the proposed source significantly outweigh the environmental and social costs imposed as a result of its location or construction by means of an analysis of alternative sites, sizes, production processes, and environmental control techniques for the source.

We have come a long way in the last year in the State of Massachusetts in terms of recognizing the potential impacts of biomass power on carbon emissions and community health. The applicant should be sent back to the

drawing board in this new environment and challenged to demonstrate how the “benefits of the proposed source significantly outweigh the environmental and social costs imposed as a result of its location or construction.” I’ll buy the popcorn.

Further, it is important to note, as stated in the former air permit, that

Emission offsets must be from the same nonattainment area or from another nonattainment area of equal or more severe nonattainment classification if emissions from this other area contribute to ozone nonattainment in the area where the new project will be constructed.

Given the “quality” of offsets that were proposed to be purchased in the Russell Biomass permit – that is, reductions in NOx emissions that had been achieved in 2000 and 2002, and were located in the Boston area – it is highly questionable whether offsets are even available to Palmer that meet the above qualifications. Has it been demonstrated that emissions in the Boston area contribute to ozone nonattainment in western Massachusetts? In fact even if the Palmer facility does purchase offsets, this will do nothing to mitigate the increase in NOx emissions in western Massachusetts that the facility will cause. Since Hampden County is out of attainment with EPA’s 8-hour ozone standard, further NOx emissions should not be permitted.

PARTICULATE MATTER EMISSIONS ARE LIKELY TO INTENSIFY UNDER THE NEW APPLICATION

Burning more wood to generate the power the NPC states the facility will generate will also increase particulate emissions. Adding a 35% increase to the amount of wood burned, as calculated above, would increase particulate emissions from 44.6 tons to over 60 tons PM per year.

There are other reasons to be cautious about the PM emissions stated in the NPC, as well. Despite the change in fuel, and the documented⁶ fact that green wood and wood chips containing bark emit more particulate matter per MMBtu than dry wood without bark, such as the facility would chiefly have burned in the earlier version of the application, the total particulate matter emissions from the plant under the NPC have not changed. Both versions of the application state that 44.6 tons will be emitted.

⁶ Sippula, O., et al. 2007. Effect of wood fuel on the emission from a top-feed pellet stove. *Energy and Fuels* 21:1151-1160. Also, Biomass Energy Resource Center. Emission controls for small wood-fired boilers. May, 2010. Montpelier, VT.

Particulate emissions profile from the old application

E. Particulate Collection Data

1. Describe the particle size weight to be emitted by the proposed unit:

	% of Total Weight	% of Fraction Collected
a. < 1 micron:	10.3	99.99
b. 1 micron < 10 microns:	85.8	99.999
c. 10 microns < 50 microns:	3.7	99.999
d. > 50 microns:	0.2	99.999

- | | |
|---|---|
| 2. What is the overall particulate collection efficiency? | 99.998% |
| 3. What is the inlet particulate concentration? (gr/ACF) | 200 |
| 4. What is the outlet particulate concentration? (gr/ACF) | 0.0044 filterable/0.074 total including condensable |
| 5. What is the emission rate? (lbs/hr) | 6.1 filterable/10.2 total including condensable |

Particulate emissions profile from the new application

E. Particulate Collection Data

1. Describe the particle size weight to be emitted by the proposed unit:

	% of Total Weight	% of Fraction Collected
a. < 1 micron:	69.7	99.983
b. 1 micron < 10 microns:	29.0	99.999
c. 10 microns < 50 microns:	1.2	99.9999
d. > 50 microns:	0.1	99.9999

- | | |
|---|--|
| 2. What is the overall particulate collection efficiency? | 99.997 |
| 3. What is the inlet particulate concentration? (gr/ACF) | 150 |
| 4. What is the outlet particulate concentration? (gr/ACF) | 0.0039 filterable |
| 5. What is the emission rate? (lbs/hr) | 6.1 filterable/10.2 total with condensable |

Significantly, the size distribution of the PM emissions does change, with greater amounts of the sub-one-micron size fraction emitted in the latest application. Smaller particulate matter size fractions are considered to present the greatest risk since they penetrate deepest into the lungs.

There does appear to be a mathematical inconsistency in the two applications. The older one states that inlet concentrations are 200 gr/ACF and that collection efficiency is 99.998%; calculating $200 - (0.99998 \times 200) = 0.004$, close to the stated outlet concentration of 0.0044 gr/ACF.

However, for the second application, $150 - (0.99997 \times 150) = 0.045$, which is 15% higher than the stated collection efficiency of 0.0038 gr/ACF. I am not familiar with all the calculations and considerations that go into calculating these rates, but this inconsistency did catch my eye.

HIGHER FUEL MOISTURE WILL EXACERBATE PARTICULATE EMISSIONS

The link between fuel moisture and pollutant emissions is well-documented. For instance, a study by NESCAUM⁷ states

Testing from this project indicates that fuel parameters, such as moisture content and wood species, play a vital role in determining air emission outcomes. Test results showed that burning seasoned hardwood resulted in the lowest emission outcomes. Table 4-1 displays the emissions from the hardwood loads. These data suggest that emissions from various seasoned hardwood loads occur within a small range from 55 grams per hour to 96 grams per hour. However, **when the moisture content of the fuel charge increases by 10 percent, emissions increase by 65 percent to 167 percent** over those obtained with seasoned hardwood.

The study also found that emissions from softwood could be 200 to 500% greater than from hardwood, and concluded:

This work suggests that the species of wood and moisture content play critical roles in determining the extent of emissions from wood burning. It is possible that these parameters will play a critical role in emission outcomes in all wood burning devices. States should consider developing fuel protocols for all wood burning sources, including wood pellets and wood chips, to ensure the lowest possible emission outcomes.

Thus, to the extent that the project has underrepresented fuel moisture, it has also underrepresented particulate emissions, not just because more fuel will be burned than stated in the NPC (probably 30% more, as stated above), but also because wetter wood emits more PM. Since the collection efficiency of the emissions

⁷ NESCAUM. Contribution of wood smoke to particle matter levels in Connecticut. Sept. 9, 2008.

controls is fixed, with a certain percentage of particulates caught by the baghouse, the actual emissions will go up as particulate generation goes up.

THE HEALTH RISK ASSESSMENT DOWNPLAYS THE IMPACT OF PM AND OTHER PLANT EMISSIONS

The health risk assessment performed by Gradient and included in the NPC contains a number of gratuitous statements that should elicit critical scrutiny. Concerning the National Ambient Air Quality standards, it states

Furthermore, the NAAQS are intended to be protective of the health of sensitive subpopulations, such as people with pre-existing disease (*e.g.*, cardiovascular diseases or asthma), children, and the elderly. Similarly, the NAAQS are established to be protective of both short-term health effects and long-term health effects by defining the averaging time for the standards. ... The NAAQS reflect the current understanding of the health effects literature, because the Clean Air Act requires US EPA to periodically review and, if appropriate, revise existing criteria and standards every five years.

Although the NAAQS are periodically reviewed and updated as part of ongoing review processes, this does not mean that prior NAAQS were not health-protective. Instead, changes in standards such as the NAAQS often reflect increased margins of safety rather than an increased expectation of adverse health effects. Judgments on what constitutes an adequate margin of safety can change as the state of the science evolves and the understanding and manner of dealing with uncertainties changes. For example, as part of the on-going review of the PM standards, US EPA is broadening its health analyses to address developmental effects and susceptible populations such as people with lower socioeconomic status (US EPA, 2010a).

This is only partially the case. As Gradient knows, The Clean Air Scientific Advisory Committee to EPA recommended during the last revision of the PM standard that lower standards be adopted, consistent with the health effects studies and risk assessments that were conducted. It is instructive to quote at length from the 2006 letter from CSCAC letter to EPA, which states (*italics in original*):

In its letter dated June 6, 2005, the CASAC recommended that the 24-hour standard for PM_{2.5} be decreased from 65 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$) to 30–35 $\mu\text{g}/\text{m}^3$. We are pleased with the Agency's decision in the final PM NAAQS rule to decrease the daily primary PM_{2.5} standard to a level consistent with the CASAC's recommendation (35 $\mu\text{g}/\text{m}^3$), as this decrease will provide additional health protection in some cities. In addition, we recommended a decrease in the annual primary PM_{2.5} standard from 15 $\mu\text{g}/\text{m}^3$ to 13–14 $\mu\text{g}/\text{m}^3$. However, the CASAC is concerned that EPA did not accept our finding that the annual PM_{2.5} standard was not protective of human health and did not follow our recommendation for a change in that standard.

The CASAC recommended changes in the annual fine-particle standard because there is *clear and convincing scientific evidence that significant adverse human-health effects occur in response to short-term and chronic particulate matter exposures at and below 15 µg/m³, the level of the current annual PM_{2.5} standard.* The CASAC affirmed this recommended reduction in the annual fine-particle standard in our letter dated March 21, 2006 concerning the proposed rule for the PM NAAQS, in which 20 of the 22 members of the CASAC's Particulate Matter Review Panel — including all seven members of the chartered (statutory) Committee — were in complete agreement. While there is uncertainty associated with the risk assessment for the PM_{2.5} standard, this very uncertainty suggests a need for a prudent approach to providing an adequate margin of safety. *It is the CASAC's consensus scientific opinion that the decision to retain without change the annual PM_{2.5} standard does not provide an "adequate margin of safety ... requisite to protect the public health" (as required by the Clean Air Act), leaving parts of the population of this country at significant risk of adverse health effects from exposure to fine PM.*

THE STATE OF MASSACHUSETTS IS ON RECORD ASKING FOR A LOWER PM NAAQS

It is also important to note that Massachusetts Secretary of the Environment Robert Gollege, along with other officials from New England states, weighed in with EPA on the PM standard. Gollege et al urged EPA to set the 24-hour PM standard at 35 ug/m³, stating

Based on the weight of evidence of health effects findings and regional demographic and monitoring data, the Northeast states believe that a 24-hr PM_{2.5} standard of 30 ug/m³ (98th percentile form) and an annual PM_{2.5} standard of 12 ug/m³ are necessary to protect public health across the region. These levels are within the range offered in the EPA Staff Paper. A requirement to reduce current emissions of PM_{2.5} and its precursors to meet a 12/30 ug/m³ standard would result in 84 percent of the region's population directly benefiting from improved air quality, include about five times more people in susceptible subgroups than at current standard levels.

Gradient's risk assessment in the NPC states:

For our HRA, Gradient compared the cumulative impacts (maximum modeled PRE Project-related concentrations plus monitored background levels) of the criteria air pollutants with the current health-protective NAAQS to assess the likelihood of potential health effects associated with PRE Project criteria air pollutant stack emissions.³ The results, as shown in Table 2, indicate that cumulative impacts are well below the health-protective NAAQS for the criteria air pollutants of concern, which include SO₂, CO, NO₂, PM, and lead.

Given that Massachusetts is already on record stating that the current PM_{2.5} standards of 35/15 ug/m³ are not sufficiently protective, the above claim by Gradient does not mean much. In fact, since EPA is currently re-

assessing the PM2.5 standards in light of the flawed 2006 standard, it is quite likely that the new 24-hour standard will be set at 30 ug/m3 in the relatively near future.

PARTICULATE MATTER LEVELS ARE ALREADY VERY HIGH IN HAMPDEN COUNTY

A quick check of the 2009 air quality report for Massachusetts available on the DEP website shows that the 98th percentile value for PM2.5 at the Springfield Liberty Street Monitor was 26.8 ug/m3 and the 1860 Main Street monitor was 29.7 ug/m3 (it is not clear why the NPC uses PM10 data from the Springfield Liberty Street monitor, but uses PM2.5 data from the Chicopee monitor, which for both 2008 and 2009 has lower PM2.5 values than the Liberty Street and Main Street monitors in Springfield). These 2009 data are likely more current than the data used in the Palmer application.

The 2009 value of 29.7 ug/m3 PM2.5 from the Main Street monitor in Springfield is the highest from any monitoring site in the entire state. Such values would be close to being out of compliance with a 24-hour standard set at 30 ug/m3. Modeled emissions from the Palmer facility would represent about a 2% increase over ambient levels, which is non-trivial when levels are so close to the potential new threshold already. The plant, if built, would represent either the second or third largest point source of particulate matter emissions in Hampden County, after the Mount Tom coal plant and possibly Berkshire Power in Agawam (PM data are from the 2005 EPA emissions inventory, thus it is possible that emissions at both the coal plant and Berkshire Power are currently lower than in the past).

PM EMISSIONS FROM MOBILE AND FUGITIVE SOURCES ARE SIMILAR TO STACK EMISSIONS

Interestingly, modeled PM emissions from fugitive and mobile sources are presented not in the body of the report, but in the Gradient risk assessment as well as in Appendix F. It is not clear why the numbers do not match between the two sections of the report. Here is a section of Table 17 from the Gradient report:

Pollutant	Averaging Period	Maximum Modeled ¹ (ug/m ³)	Monitored Background ² (ug/m ³)	Cumulative Impact ³ (ug/m ³)	NAAQS (ug/m ³)	Modeled Year
CO	1-hr	6.077	3876.0	3882.1	40,000	1993
	8-hr	4.254	2850.0	2854.3	10,000	1993
NO ₂	1-hr	11.079	95.9	107.0	188	1991
	Annual	1.110	18.8	19.9	100	1991
PM ₁₀	24-hr	2.283	49.0	51.3	150	1991
	Annual	0.611	19.0	19.6	50 ⁺	1991
PM _{2.5}	24-hr	0.483	28.1	28.6	35	91-95
	Annual	0.120	9.3	9.4	15	91-95

Here is Table 5-19 in Appendix F:

Table 5-19 Mobile & Fugitive Source Modeling Results (SILs)

Pollutant	Averaging Period	Modeled Conc. ($\mu\text{g}/\text{m}^3$)	EPA SIL ($\mu\text{g}/\text{m}^3$)	Year
PM10	24-hr	2.79	5	1991
	Annual	0.66	1	1991
PM2.5	24-hr	0.53	2.0 ¹	91-95
	Annual	0.13	0.3 ¹	91-95

¹ The PM2.5 SIL presented is per MassDEP's Guidance – Permitting Issues Related to PM2.5, dated 7/27/07 and Proposed MassDEP Guidance for Permitting New Sources of PM2.5 Draft, Massachusetts SIP Steering Committee, April 29, 2008. EPA guidance (EPA, 2010) states that the highest average of the modeled annual averages across 5 years for National Weather Service (NWS) meteorological data be compared to the annual screening level (SIL). Similarly, the highest average of the maximum 24-hour averages across 5 years for NWS meteorological data should be compared to the 24-hour screening level (SIL).

Why do the data for PM2.5 not match between the two tables? There is a significant difference between the modeled value of 0.483 $\mu\text{g}/\text{m}^3$ in the Gradient table, and 0.53 $\mu\text{g}/\text{m}^3$ in the table from Appendix F.

MEPA should consider that the fugitive and mobile source PM contribution is on a par with the modeled concentration from stack emissions, which is reported in Table 5-4 of the report as 0.57 ug/m³ for the 24-hour impact:

Table 5-4 Predicted Impact Concentrations with EPA Significant Impact Levels

Pollutant	Averaging Period	Emission Rate (g/s)	Normalized Conc. (µg/m ³)/(g/s)	Modeled Conc. (µg/m ³)	EPA SILs (µg/m ³)	Meteorological Year
NO ₂	Annual	1.42	0.04900	0.05	1	1993
SO ₂	3-Hour	1.286	3.36608	4.33	25	1994
	24-Hour	1.286	0.73531	0.95	5	1991
	Annual	1.286	0.04900	0.06	1	1993
PM ₁₀	24-Hour	1.286	0.73531	0.95	5	1991
	Annual	1.286	0.04900	0.06	1	1993
PM _{2.5}	24-Hour	1.286	0.44075	0.57	2	91-95
	Annual	1.286	0.03980	0.05	0.3	1993
CO	1-Hour	8.34	8.13271	67.83	2,000	1994
	8-Hour	4.49	1.89497	8.51	500	1992

- 1 The PM_{2.5} SIL presented is per MassDEP's Guidance – Permitting Issues Related to PM_{2.5}, dated 7/27/07 and Proposed MassDEP Guidance for Permitting New Sources of PM_{2.5} Draft, Massachusetts SIP Steering Committee, April 29, 2008. EPA guidance (EPA, 2010) states that the highest average of the modeled annual averages across 5 years for National Weather Service (NWS) meteorological data be compared to the annual screening level (SIL). Similarly, the highest average of the maximum 24-hour averages across 5 years for NWS meteorological data should be compared to the 24-hour screening level (SIL).
- 2 NO₂ concentrations assume a NO_x to NO₂ conversion rate of 0.75 using the "Ambient Ratio Method" outlined in Appendix W of 40 CFR 50.

The combined stack, fugitive, and mobile source emissions would represent about a 4% increase over ambient levels. Evaluated in the context of a potential 24-hour standard set at 30 ug/m³, this increase is not acceptable.

AIR TOXICS EMISSIONS WILL ALSO INCREASE SIGNIFICANTLY DUE TO MOBILE SOURCES

Similarly, the risk assessment notes that contributions of fugitive and mobile sources of other pollutants are actually in some cases more than double emissions for the facility when they are taken into account, but again falls back on the justification that these emissions are lower than ambient levels. This argument is worse than invalid.

Tables 18 and 19 address potential emissions of several air toxics, including formaldehyde, acetaldehyde, benzene, acrolein, and 1,3-butadiene, from PRE Project-related mobile and fugitive sources. As shown in Table 18, **maximum modeled annual average impacts of these air toxics are slightly higher for mobile and fugitive source emissions than for the PRE Project stack air emissions** (note that 1,3-butadiene, which is associated with diesel truck emissions, was not previously evaluated for PRE Project stack air emissions). However, Table 18 also shows

that these maximum modeled annual average impacts remain far below estimates of background air concentrations for these air toxics that are based on the measurement data available from the Chicopee air toxics monitor.

Gradient's risk analysis downplays the impact of emissions from the Palmer facility, stating

Table 2 uses maximum modeled PRE Project-related concentrations that represent the highest exposure concentrations to criteria air pollutants for a single location. As such, they are not representative of the time- and spatially-averaged exposures that would be anticipated as an individual moves among different locations (*e.g.*, home, workplace, stores, *etc.*) within a community.

This statement is strange in light of the fact that earlier in the main body of the NPC, there is an assessment of the impact of particulate emissions on schools, where kids are trapped all day and are not "moving among different locations" as the Gradient assessment states. For instance, the NPC states (page 5-12) that "the maximum 24-hr and annual modeled PM2.5 concentrations also occur at Springfield Central High School." Table 5-6 in the NPC points out that ambient PM2.5 levels as modeled with the project's influence would "only" be 80.29% at Springfield Central High School, The Samuel Bowles School, and the Mary O. Pottinger School, (the actual value should be 80.86%) failing to acknowledge that if and when the 24-hour NAAQS is lowered to 30 ug/m3, the modeled value of 28.3 ug/m3 would be 94% of the new standard.

TOXICS DATA FROM CHICOPEE DEMONSTRATE THAT THE AIR IS ALREADY UNHEALTHY

The sudden production of air toxics data from the Chicopee monitor is timely; back when the project was proposing to emit large amounts of heavy metals, there were no such background data to be found in the air application. Now, incredibly, data from Chicopee have been produced that appear to show that ambient arsenic, cadmium, acetaldehyde, formaldehyde, and other HAPs dramatically exceed Massachusetts health standards. These data confirm that any additional emissions from a combustion source, whether it be burning treated or "clean" wood, will add to the total toxics burden in the area. Had these data been available when Palmer was proposing to emit arsenic at a concentration that would itself constitute 51% of DEP's health threshold, the dialogue around that earlier air application would have been very different. It is hard to know what to say, seeing these data now conveniently produced when the project claims it will no longer emit large quantities of heavy metals.

Amazingly, regarding the apparently high ambient levels of toxics in the atmosphere, the Gradient report seems to rely on the logic that "levels of toxics are already high and cancer risks are already elevated, so what difference will more emissions make?" The report further includes the following nonsensical statement:

Figures 1 and 2 illustrate that some of the non-cancer and cancer health risks calculated using the measured background air toxics concentrations from the Chicopee air toxics monitor are near regulatory criteria. However, Figures 3 and 4 compare 2006-2008 average air toxics

concentrations for the Chicopee monitor with 2006-2008 average air toxics concentrations measured at the Boston air toxics monitor (Harrison Avenue, Roxbury), showing that there are comparable concentrations in the Boston area. This comparison indicates that background air toxics concentrations in the Chicopee area are of similar magnitude to those found in one of the few other Massachusetts areas where comparable air toxics data are available. Further, these data demonstrate the negligible incremental impact on potential health risks associated with the maximum modeled PRE Project air toxics concentrations.

What is the report trying to say here? That although toxics concentrations are “near” regulatory criteria (a masterful understatement, considering that some dramatically exceed these criteria) at least the Chicopee air is about as polluted as the Boston air (the data show “that there are comparable concentrations in the Boston area”) – and then goes on to state this again (“toxics concentrations in the Chicopee area are of similar magnitude to those found in one of the few other Massachusetts areas where comparable air toxics data are available”). I am sorry to bore an overworked MEPA reviewer by drawing out this point but it is incredible to me that this stunning conclusion (Chicopee air toxics are similar to Boston air toxics, thus showing that Chicopee air toxics are similar to Boston air toxics) is then followed by the conclusion that this “demonstrates” that the impact of Palmer’s emissions will be negligible. Is this really the reasoning that should underlie a risk assessment?

Some conclusions of the toxics assessment in the Gradient report are difficult to evaluate, they seem so incredible. The report includes an assessment of the one-hour concentrations of respiratory irritants on closest area schools (Table 10). However, the report actually includes the modeled emissions from the plant as the “total” emissions at impacted areas, excusing the failure to include data on ambient levels because the Chicopee monitor does not provide hourly data, only yearly averages. The table thus reports the “maximum modeled 1-hour concentrations” of formaldehyde, acetaldehyde, and acrolein as simply the plant emissions, without taking background levels into account, even though the data from the Chicopee monitor reveals that annual average ambient concentrations of formaldehyde and acetaldehyde are already orders of magnitude higher than what is being represented as ambient levels. These emissions data have no business being in this table standing in for ambient concentrations - the table is actually misleading because of their inclusion.

Throughout the risk assessment are to be found gratuitous sections helpfully “putting into context” how small the amounts of pollutants emitted by the plant really will be (implication: don’t worry, it’s trivial). This material simply shows that the risk assessment is biased and intent on downplaying actual risk. Many substances, such as endocrine disruptors, operate in the parts-per-trillion range, so the breathless description by Gradient of how small a part per billion really appears deliberately misleading (Environmental Working Group’s “Ten Americans” video -(<http://www.ewg.org/kid-safe-chemicals-act-blog/kid-safe-chemicals-act-10-americans-video/>) - provides a good overview of the problem of trace amounts of toxics in the environment, for instance highlighting that babies are born “pre-contaminated” with pollutants). Fortunately in the age of the internet people can educate themselves on such issues.

MEPA will be relieved to know that this is as far as I am going to go for now in evaluating the Gradient risk analysis. It is obviously biased, the data are incomplete, the authors intent on selling their case that impacts

from this plant will be negligible, even though a simple review of EPA data reveals that this plant, if built, would be one of the largest emitters of pollutants in Hampden county. It is simply not time well spent at this point to highlight the many flaws, misstatements, and active misrepresentations in this document, but if MEPA cares to require a credible environmental impact report, MEPA may be assured of continuing scrutiny of the issue.

THE NPC GREENHOUSE GAS EMISSIONS ANALYSIS IS INADEQUATE

The greenhouse gas emissions analysis included in the NPC was performed voluntarily, the proponent states, but with the cognizance that the Secretary can require such an analysis even if one is not required under the regulations. Given the amount of time and effort that DOER has devoted to crafting a new biomass policy that is intended to limit carbon emissions from biomass energy facilities, it is impossible to imagine any scenario where EOEEA would not be interested in the greenhouse gas emissions from the Palmer facility. That is why it is disappointing, but unfortunately not surprising, that the analysis provided in the NPC is so inadequate.

The Palmer NPC claims that the new fuel supply will be sourced solely from “non-forest” waste wood, and makes three statements about the prospective fuel source:

- a. Although there are multiple uses and disposal options that make up the market for GWC, there is a surplus of supply in the region. Most of the largest producers (tree service and utilities) estimate leaving 15-25% of the chipped material on the ground at/near the worksite (“managed on-site”) because there is no economic alternative. The otherwise-wasted quantity estimated from this survey is equal to approximately 45% of PRE’s requirements.
- b. About 30% of the processed GWC is currently being sent to power plants from MA to ME, a considerably greater distance than the traditional “rule-of thumb” of 50 miles for economic transport. This is at least partially due to scarcity of in-state biomass power plants, and because the local markets for mulch, erosion control cover, etc., are saturated and disposal alternatives are unavailable or are themselves expensive.
- c. Approximately 40% is currently used for mulch or erosion control; i.e., placed on the surface to decompose, excluding the managed on-site fraction of the supply. Only on the order of 2% is landfilled.

It is difficult to evaluate the wood availability study without seeing the data or the study design. However, it is clear that the proponent is relying on numbers extrapolated from a relatively small sample, and not even a random sample. The NPC claims that about 45% of Palmer’s fuel needs could be met just with the material chipped and left onsite when treework is done or land is cleared. However, it is important to recall that actual fuel use would probably be about 35% higher than stated in the NPC, thus a greater percentage of this fuel source would be required.

Would the project take materials that would otherwise be used for firewood, or mulch? Has this possibility been evaluated? How will the companies who use these materials feel about the state permitting this biomass burner to swoop in and scoop up their materials? It is well documented that the debacle of the federal Biomass Crop Assistance Program, where federal dollars matched plant payments for fuel at \$40/ton, has hurt other industries that rely on these materials. Biomass burning facilities receive subsidies that other industries do not. Should Palmer essentially be subsidized to take these materials, even if it hurts other business interests? The NPC claims the mulch industry is “saturated”, but I do not see giant piles of unused wood sitting around. I suspect there is a market for many of these materials.

The greenhouse analysis takes credit for a number of practices but omits to count emissions from other, just as obvious factors. For instance, while the analysis claims a reduction in greenhouse gas emissions by avoiding trucking of material to power plants in other locations, it neglects to consider that these other facilities must get their fuel from somewhere, and that their net emissions will not decrease just because the Palmer plant has become operational. If this were indeed the case, the amount of biomass power in the region would never increase – the existing plants would simply trade off different weeks using a finite fuel supply. In this case, one would have to ask, what is the point of building any new plant at all?

This fallacy that indirect emissions associated with fuel use do not matter – and the tendency to ignore the principle of additionality when reckoning biomass fuel supplies – is widespread. The NPC even makes this claim about conventional air pollutants, seemingly drawing on the logic that emissions at other plants will be reduced if the Palmer plant becomes operational:

Some of the GWC currently sent large distances to other New England Power plants will be diverted to PRE, reducing transportation costs and transportation-related GHG emissions. Diversion of this material to a local user will also add benefits to the local economy by reducing supplier costs associated with long-distance haul. **Regional air quality will also benefit**, not only from reduced trucking, but more importantly from the lower emissions profile of the PRE plant (e.g. for NO_x, CO, VOC) that will be significantly better controlled than existing plants in northern New England.

This does not pass the straight face test.

The NPC not only implies that power generation and emissions will decrease from other biomass plants when Palmer takes their fuel, but that power generation at fossil fuel plants will decrease, as well:

Gross GHG emissions from the power plant are partially offset by avoided emissions from alternative processes. The existence of the power plant diverts fuel materials from other uses or disposal. Trucking distances for those alternatives also impact the net GHG emissions. Moreover, the electricity sold to the utilities **may avoid the generation of that electricity by largely fossil fuel-burning powerplants**, thus avoiding those GHG emissions as well.

There is nothing but speculation to back up this statement in the “analysis” and it should not be included. However, the analysis goes on to actually take credit for “avoided emissions” from fossil-fueled powerplants:

The PRE facility will produce approximately 276,000 megawatt-hours (MWh) of electricity annually. PRE has evaluated increases in or reductions of electricity use by the Project by using the GHG rates representative of the actual utility grid operation from published ISO New England reports. For the Project, this avoided generation, using ISO-New England’s latest marginal emission rate for utility-generated electricity, results in avoiding just under 125,000 tpy of GHG emissions.

Is this the precedent that has been set in other MEPA greenhouse gas analyses? Would it be tolerated if a new coal plant came to town, and took credit for displacing power generation and thus emissions from the natural gas plant down the road? Because that is, to all extents and purposes, what is happening here. Carbon emissions from this plant only differ from those of a coal plant in that they are greater, per unit energy produced, a situation that may be nominally compensated by the likelihood that at least some of these emissions would have “happened anyway”, if the materials were left to decompose. Actual particulate emissions and NOx emissions will not differ much from rates emitted by coal-fired plants, either.

The NPC is careful to state that the greenhouse gas analysis presented is specific to the set of assumptions employed:

The actual sources will depend on market dynamics and will probably vary from year to year. For the purpose of this GHG Analysis, it is estimated that 50% of PRE’s GWC supply is diverted from being shipped to more distant power plants. The remaining 50% is assumed to be recovered from the current practice of leaving material on the ground at work sites, diverting from landscaping uses and from other surpluses.

So there is no real analysis here, just a couple of extremely simplified and unrealistic assumptions that the NPC basically states are not real, but are simply employed “for the purposes of this analysis”.

After a long and complicated series of explanations, none of which acknowledge that taking material and burning it will simply cause users of that material to find other sources, which may in fact include increasing forest harvesting, the NPC finally concludes

For purposes of this analysis, the GWC material is considered to be essentially “carbon neutral”.

Ultimately, the greenhouse gas “analysis” it comes down to this one sentence, which essentially reveals the whole analysis was building to a pre-determined conclusion.

WOOD CHIP PILES AS A POTENTIAL SOURCE OF METHANE EMISSIONS

The GHG analysis does not include an analysis of the methane likely to be emitted from wood chip piles. Has this factor been considered? As biomass proponents never tire of telling us, methane hypothetically emitted from rotting wood is a powerful greenhouse gas. According to the fuel analysis, only about 2% of waste wood is landfilled, thus this argument should lose some of its power. However, there is an actual risk of methane emissions from massive, damp, fermenting fuel piles. Studies have found significantly greater rates of decomposition and mass loss for whole-tree chips than clean, debarked chips, and that piles of whole-tree chips are more prone to spontaneous combustion than clean, debarked chips.⁸ Oceanic transport of pellets, which are processed and dried and thus present less risk of fermentation than green chips, has nonetheless been found to sometimes result in dangerously high buildups of toxic gasses during transport. One study found average methane concentrations of 605 ppm in the hold areas of vessels transporting wood pellets.⁹

FUEL HANDLING PLAN APPEARS TO BE UNREALISTIC

As a practical matter, the fuel storage plan for the facility strikes me as unconventional. The NPC states that there will actually be two chip storage facilities, a covered pile at the plant, and a pile offsite. Both will hold about four days worth of chips.¹⁰ The NPC states that the Palmer facility will keep only about 4.5 days worth of fuel on hand, or about 5,000 tons. Even so, this pile will be about 30 feet tall. Of course, given that the fuel will actually be wetter than the NPC states, 5,000 tons will not be enough fuel to power the plant for 4.5 days. In any case, this strikes me as an unrealistic scenario. No one does “just in time” sourcing for biomass fuel. One can imagine any number of scenarios where the fuel storage needs would be found to be greater. Is there a reason that the applicant is so concerned to appear to only keep a few days fuel on hand? Some limits on the size of the storage facility, which will then be appealed, should be the facility become operational? MEPA should require the proponent to explain why they are not pursuing a more conventional fuel storage plan.

TRANSPORT OF ASIAN LONGHORN BEETLE IN WOOD CHIP FUEL

As a matter of concern: since Northern Tree Service is cited as a company dealing with the Asian Longhorn Beetle infestation, and also as having a financial stake in the facility, what are the chances that chips containing beetle larvae, or trucks that frequent that area and may transport insects, will not make their way into the Springfield area? With regard to the bright future of ongoing green wood chip availability, the NPC does state

Destructive native and non-native forest pests (insects and diseases) are projected to continue to invade and adversely affect New England and Massachusetts’ shade trees and forests

⁸ Springer, E. 1980. Should whole-tree chips be dried before storage? USDA Forest Products Laboratory Research Note FPL-0241.

⁹ Svedberg, U., et al. 2008. Hazardous off-gassing of carbon monoxide and oxygen depletion during ocean transportation of wood pellets. *Annals of Occupational Hygiene*, 52:259-266.

¹⁰ Attachment I, the 363rd page of the NPC pdf.

Which sounds a lot like they might be counting on using that insect-infested wood in the future. A properly constructed EIR would allow the proponent to explain how this situation may be avoided.

Finally, what is stopping this plant from using forest wood? The NPC claims the project will go forward, with or without renewable energy credits, thus the draft DOER policy on biomass is likely to have little influence. What, other than the developer's good nature, would prevent this plant from using forest wood when the supply of "non-forest waste wood" runs low?

Thank you for your attention, and thank you for the opportunity to comment.

Sincerely,
Mary S. Booth
Massachusetts Environmental Energy Alliance